SONY

UHF SYNTHESIZED TUNER UNIT

WRR-855B

SERVICE MANUAL

1st Edition

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l’entretien. Afin de réduire les risques de décharge électrique, d’incendie ou de blessure n’effectuer que les réparations indiquées dans le mode d’emploi à moins d’être qualifié pour en effectuer d’autres. Pour toute réparation faire appel à une personne compétente uniquement.

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SONY

3-205-489-**11** (2)

UHF Synthesized Dual Diversity Tuner

Operating Instructions GB

WRR-855A/WRR-855B

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Owner's Record

The model and serial numbers are located at the rear of the unit. Record the serial number in the space provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. WRR-855A/855B **Serial No.** _____

Notice for customers in the U.S.A.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

If you have any questions about this product, you may call:
Sony's Business Information Center (BIC) at 1-800-686-SONY (7669)
or Write to:
Sony Customer Information Services Center 6900-29 Daniels Parkway, PMB 330 Fort Myers, Florida 33912

Declaration of Conformity

Trade Name:	SONY
Model No.:	WRR-855B
Responsible Party:	Sony Electronics Inc.
Address:	1 Sony Drive, Park Ridge, NJ.07656 U.S.A.
Telephone No.:	201-930-6972

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Notice for customers in Canada:

Use of Sony wireless devices is regulated by the Industry Canada as described in their Radio Standard Specification RSS-123.
A licence is normally required. The local district office of Industry Canada should therefore be contacted. When the operation of the device is within the broadcast band, the licence is issued on no-interference, no-protection basis with respect to broadcast signals.

Operation of this device is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Avis pour les clients au Canada:

L'usage des appareils sans-fil Sony est réglé par l'Industrie Canada comme décrit dans leur Cahier des Normes Radioélectriques CNR-123.
Une licence est normalement requise. Le bureau de l'Industrie Canada doit être contacté. Lorsque l'opération de l'appareil est dans les limites de la bande de radiodiffusion, la licence est émanée sur la base de non-interférence, non-protection avec les signaux de radiodiffusion.

L'utilisation de cet appareil est soumise aux deux conditions suivantes : (1) cet appareil ne peut causer d'interférences, et (2) cet appareil doit accepter toutes les interférences, y compris les interférences capables de provoquer un fonctionnement indésirable de l'appareil.

Notice for customers in Europe
Spécifications particulières pour les consommateurs européens
Hinweis für Kunden in Europa
Aviso para los usuarios en Europa

CE

U.K.	854.125 - 862 MHz
Turkey	854.125 - 862 MHz
Spain	841.250, 841.750, 842.250, 842.750 MHz 843.250, 848.750, 849.250, 849.750 MHz 850.250, 850.750, 851.250, 851.750 MHz
Germany	798 - 822 MHz
Norway	800 - 820 MHz
Luxembourg	800 - 830 MHz, 854.125 - 862 MHz
Belgium	854.125 - 862 MHz
Denmark	800 - 820 MHz
France	470 - 830 MHz
Greece	800 - 820 MHz
Ireland	800 - 820 MHz
Italy	800 - 820 MHz
Portugal	800 - 820 MHz
Sweden	800 - 820 MHz
Switzerland	800 - 820 MHz
Finland	800 - 814 MHz
Iceland	800 - 814 MHz
Austria	774 - 790 MHz
Netherland	774 - 782 MHz

Hereby, Sony Corporation, declares that this WRR-855B is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Sony Corporation déclare par la présente que ce WRR-855B est conforme aux exigences fondamentales et aux autres dispositions applicables de la Directive 1999/5/CE.

Hiermit erklärt die Sony Corporation, daß das Modell WRR-855B die grundlegenden Anforderungen und sonstigen relevanten Bestimmungen der Richtlinie 1999/5/EU erfüllt.

Por la presente, Sony Corporation, declara que este WRR-855B cumple con los requisitos esenciales y otras disposiciones pertinentes de la Directiva 1999/5/CE.

Reprinted from the operating instructions

English

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Precautions

On operation

- The tuner unit must be used within the temperature range of 0°C to 50°C (32°F to 122°F). Avoid using for an extended period of time in extremely high temperature, or the place subject to direct sunlight, especially outdoors, because the finish of the case might be damaged.
  Never install the tuner on or near heat sources, such as lighting equipment, power amplifiers.
- The tuner is designed to be portable and is built to resist humidity and dust. However, try to avoid using in very humid or dusty places, because such use may shorten the life of the tuner unit.
- To avoid degradation of the signal-to-noise ratio, do not use the tuner in noisy places or in locations subject to vibration, for example:
  –near electric equipment such as motors, transformers or dimmers
  –near air conditioning equipment or places subject to direct air flow from an air conditioner
  –near a public address loudspeaker
  –in a location where adjacent equipment might knock against the tuner.
- The switching of lights may produce electrical interference over the entire frequency range.
  Position the tuner and the wireless microphone in a place where such interference is at minimum.
- The unit has been factory adjusted precisely. Do not tamper with its internal parts or attempt to repair it.

Preprogrammed wireless channel plans for simultaneous multi channel operation
The WRR-855A/855B has many preprogrammed channel groups, meaning combination of wireless channels to permit simultaneous operation of multiple channels without intermodulation.

For the channel plans available on your unit, see "Wireless Microphone System Frequency List" supplied with this manual.

Space diversity reception system
The WRR-855A/855B provides stable signal reception with only a minute amount of dropout.

Versatile display
A variety of information is obtained at a glance on the upper panel, such as the reception channel with the liquid-crystal display, and RF input level and audio level with the respective LEDs.

Compact and lightweight
Innovative, high-density mounting technology has enabled the creation of this compact, lightweight tuner. Using the optional BTA-801 Portable Tuner Mount Adapter in combination, the WRR-855A/855B can be easily attached to a Betacam-series Camcorder.

Weatherproof structure
By properly mounting the WRR-855A/855B to the optional BTA-801 Portable Tuner Mount Adapter and attaching the two supplied antennas, a weatherproof structure is obtained.

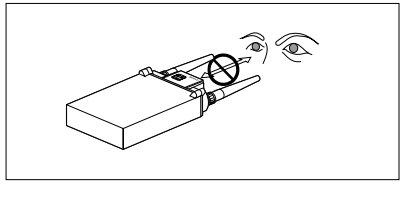
Muting ON/OFF function
You can activate or deactivate the muting function to suit your needs.

Tone-squelch circuit for noise elimination
The unit uses a built-in squelch circuit to selectively receive the desired RF carrier accompanied by the tone signal from the transmitter.

Compander system
A compander (compressor/expander) system enables stabilized wireless transmission over a wide dynamic range.

Precautions

- When looking into the upper-panel displays, be careful to keep a sufficient distance between your eyes and the tuner unit.



On cleaning
Clean the tuner unit with a dry, soft cloth. Never use thinner or benzine, since these will damage the finish.

Overview

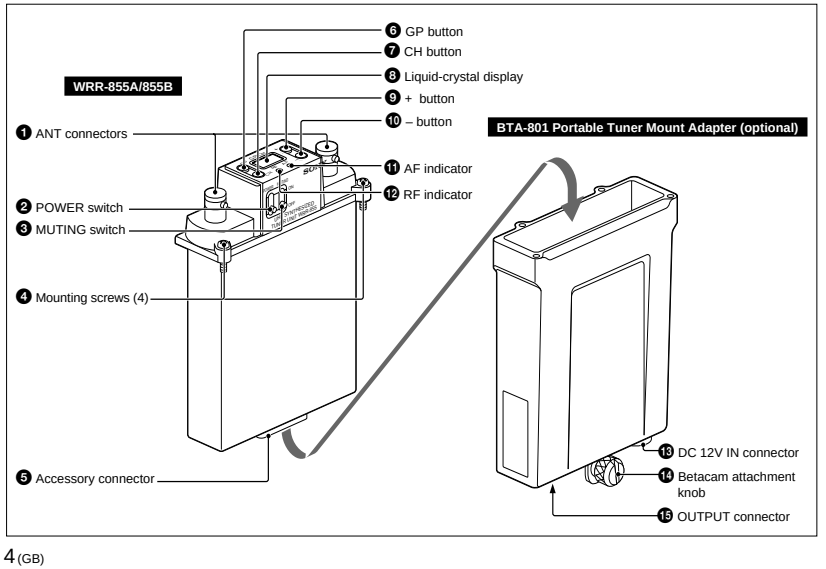
The WRR-855A/855B UHF Synthesized Tuner Unit in use with an optional Portable Tuner Mount Adapter, such as the BTA-801, provides a highly reliable portable diversity tuner for the Sony UHF wireless microphone system, which uses the frequency bands allocated for UHF TV broadcasting. This tuner enables the application of multiple channels over unused television channels through the use of the built-in Sony original channel plan.

Features

Wide Operating Frequency ranges
The WRR-855A operates over a 14 MHz frequency band within the range of 792 MHz to 806 MHz (model available in Australia) , while the WRR-855B operates over a 24 MHz frequency band between 470 MHz to 806 MHz (model available in U.S.A.), or 470 MHz to 862 MHz (model available in Europe).

WRR-855A
Model available in Australia:
792 to 806 MHz, TV channels 66 to 67
WRR-855B
Model available in USA:
470 to 806 MHz, TV channels 14 to 69
(14 frequency band, divided into 24 MHz range. All 14 frequency bands may not be available in some areas.)
Model available in Europe:
470 to 862 MHz, TV channels 21 to 69
(17 frequency band, divided into 24 MHz range. All 17 frequency bands may not be available in some areas.)

Parts Identification



WRR-855A/855B

❶ ANT (antenna) connectors
Connect the two supplied antennas to these connectors.

❷ POWER switch
Turns the power ON/OFF.

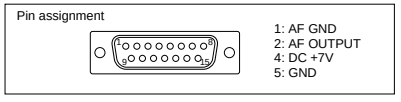
❸ MUTING switch
Turns the muting ON/OFF. The muting level is fixed at 10 dBμ.

Note

If you turn off the muting when the tuner is in standby condition for signal receiving or when the RF input level is low, noise may be heard or the connected device or speakers may be damaged. Be sure to operate this switch only after minimizing the input of the connected device.

❹ Mounting screws
Used to secure the WRR-855A/855B to the BTA-801.
For mounting, see "Mounting to a Portable Tuner Mount Adapter" on page 7.

❺ Accessory connector
For the signal and power connections with the BTA-801.



❻ GP (group set) button
Press and hold down for at least one second to go to the group selection mode, and the group number flashes on the display.
See "Settings" on page 9.

❼ CH (channel set) button
Press and hold down for at least one second to go to the channel selection mode and the channel number flashes on the display.
See "Settings" on page 10.

❽ Liquid-crystal display
On the WRR-855A: When you turn the power ON, the "HELLO" message appears, then the tuner unit goes to normal display mode.
On the WRR-855B: When you turn the power ON, the version number of your tuner (for example "U66") appears, then the tuner unit goes to normal display mode.

Parts Identification

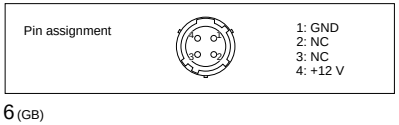
❾ + button / ❿ – button
Press to select the group and channel numbers to be received.
See "Settings" on pages 10 and 11.

⓫ AF (audio frequency level) indicator
Lights when an audio signal greater than the reference level is output.

⓬ RF (radio frequency input level) indicator
Displays the strength of the input signal.
Lights in green: Higher than 25 dBμ
Lights in red: 10 to 25 dBμ
Goes off: Lower than 10 dBμ

BTA-801 Portable Tuner Mount Adapter (Optional)

⓭ DC 12V IN (power input) connector
Connect to an external power supply (DC 10 to 17 V) of a Betacam using the DC power cable supplied with the BTA-801.

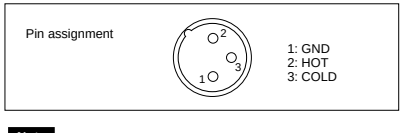


Note

Be sure to check the operating voltage and polarity when connecting to a power source.

⓮ Betacam attachment knob
Used to fix the unit to a Betacam.
For attaching the unit to a Betacam, see page 13.

⓯ OUTPUT connector (XLR 3-pin, male)
Supplies audio signals. You can connect this to the microphone input connector of a Betacam, mixer, tape recorder or other similar equipment.



Note

When connecting to an audio mixer which has a Phantom powering capability for microphones, it is recommended to use the mixer with the Phantom power OFF.

Preparations

Mounting to a Portable Tuner Mount Adapter

This section shows you how to mount the WRR-855A/855B to the BTA-801 Portable Tuner Mount Adapter for example.
By properly mounting the WRR-855A/855B to the BTA-801 and attaching the two supplied antennas, a weatherproof structure is obtained.

Before mounting

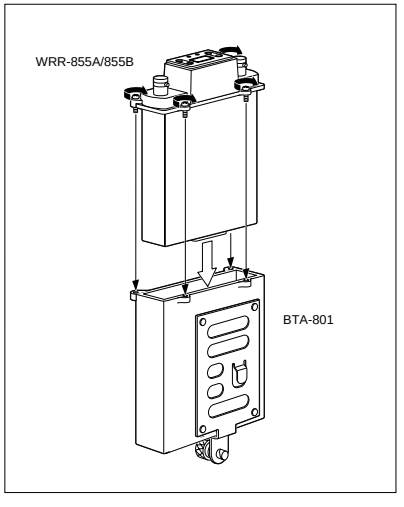
Be sure to clean the abutting surfaces of the WRR-855A/855B and the BTA-801 before mounting.

Procedure for mounting to the BTA-801

1 Observing the direction, insert the WRR-855A/855B in the BTA-801.

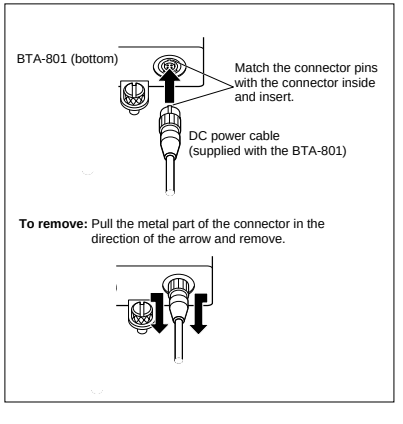
2 Push the WRR-855A/855B until the accessory connector clicks into place.

3 Run in the four mounting screws little by little in turn to gradually secure the units together, then tighten them.



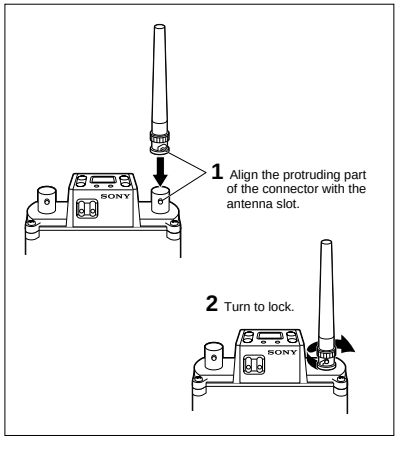
Connecting the Power Cable

Connect the DC 12 V IN connector of the BTA-801 to the DC OUT connector of a Betacam-series Camcorder using the DC power cable supplied with the BTA-801.


BTA-801 (bottom)
Match the connector pins with the connector inside and insert.
DC power cable (supplied with the BTA-801)
To remove: Pull the metal part of the connector in the direction of the arrow and remove.

Attaching the Antennas

Attach the supplied antennas to the two ANT connectors.



Settings

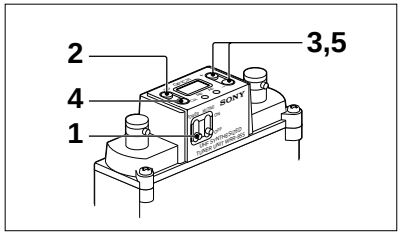
Channel Selection

Notes

Take the following precautions to prevent interference and noise.

- Do not simultaneously use two or more microphones and transmitters that are set to the same channel.
- When using two or more tuners simultaneously, always set the tuners that use the same groups (other than group 00) to different channels in that group.
- The reception antennas and transmitter should be used at least 3 meters away from each other.

Operations



1 Turn the POWER switch ON.
On the WRR-855A, the "HELLO" message appears on the display, then it changes to the tuner status indication shown before the tuner was previously turned off.
On the WRR-855B, the version number of your tuner (for example "U66") appears, then it changes to the tuner status indication shown before the tuner was previously turned off.

Note

POWER switch operation should be performed after disconnecting the input from connected equipment, as noise will be heard if the switch is turned ON or OFF beforehand.

2 Press and hold the GP button down for more than one second.
The tuner goes to the group selection mode and the group number flashes.

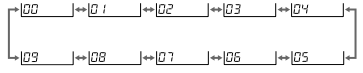
Group selection mode

3 Press the + or – button to select the group.
Pressing the + button cyclically changes the groups in

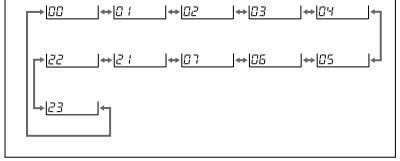
(Continued)

numerical order and pressing the – button changes them in the reverse order.
Press and hold down the button to continuously change the display.

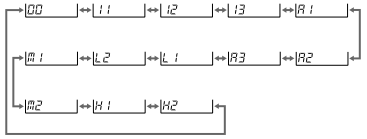
Model available in USA



Model available in Europe (CE21)



Model available in Australia



If no buttons are pressed for 5 seconds, the group selection mode is automatically cancelled and the lowest frequency channel in the group selected at that time is displayed.
For Group 00, however, the channel previously set in Group 00 appears.

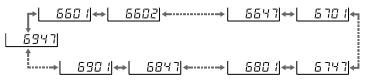
4 When the desired group is displayed, press the CH button.
The tuner goes to the channel selection mode and the channel number flashes.

Channel selection mode

Display example for U66 model

5 Press the + or – button to select the channel.
Pressing the + button cyclically changes the channels of the group selected in step **3** in the listed order in the respective table in the *"Wireless Microphone System Frequency List "* supplied with this manual.
Pressing the – button changes them in the reverse order.

When the group 00 is selectedfor U66 model



When you reach the last channel in the group, press the + button to return to the first channel in the group.
Likewise, press the – button to go from the first channel to the last channel.

6 After the desired channel is displayed, leave the unit for 5 seconds without pressing any buttons.
Channel selection mode is automatically canceled and the channel shown on the display is set.

Storing the group and channel

The selected group and channel set by the above procedure are stored in memory when the display stops flashing.

Notes

To eliminate interference or noise, please note the following.

- Do not use two or more wireless microphones or transmitters whose wireless channels are the same.
- If there is a TV broadcasting station nearby, to avoid possible interference from its broadcast, do not use that station's channel.
- The number of wireless channels actually usable in a multi-channel system may be smaller than the normal capacity of that system if there is interference from TV broadcasting or other RF signals.
- To operate two or more UHF synthesized wireless microphones/transmitters using the same wireless channel of the same group, ensure that the wireless microphones/transmitters are at least 100 m (330 feet)[1] apart as far as they are installed within sight of each other.
- When using two or more WRR-855A/855Bs, do not directly put one unit upon the other.

1) The distance depends on the operating environment and conditions.

Interference-check function

Before operating a wireless microphone or transmitter, you can check for possible interference by using the interference-check function of this unit. To check the interference, simultaneously press the + and – buttons in the channel selection mode (the channel number flashes). The channels of the selected group are automatically switched one by one in sequence (this operation is called "scanning").

Notes

- When the MUTING switch is ON and the unit is not in the T OFF mode (see page 13), scanning stops and the channel at that time is selected if a tone signal (32.768 kHz) is detected in the signal received during scanning. However, scanning will not stop if a interfering signal having no tone signal is received. In this case, check for the interference by observing the RF input level indicator.
- Scanning is automatically cancelled when all the channels of the selected group are scanned twice. To cancel scanning in progress, press any of the operation buttons.
- If an extremely strong signal is received, scanning may stop at a point other than the actual channel.

Setting and Releasing the T (Tone Squelch) OFF Mode

The WRR-855A/855B has the following three muting functions, which work in combination.

(1) Muting by RF input level: As sufficient S/N for the audio output may not be obtained if no RF signal is received or the RF input level is low, the audio output can be muted when the RF input level falls below the selected level.
(2) Tone squelch: The audio output is obtained only when the tuner receives an RF signal which includes a specified tone signal. The audio output is muted to eliminate noise which may be heard when the transmitter is turned on/off or the tuner receives an interference RF signal.
(3) Noise squelch: The audio output is muted to eliminate noise which may be heard when there is such excessive interference RF signal that the tone squelch does not work.

Only the muting functions described in **(2)** can be canceled by selecting the Tone-squelch OFF (T OFF) mode when desired. Apply this mode when you use a transmitter with no specified tone signal.

Selecting the T OFF mode

1 Turn the power ON while pressing and holding the GP and – buttons.

2 On the WRR-855A, release the buttons after the "HELLO" message appears. On the WRR-855B, release the buttons after the version number of your tuner (for example "U66") appears.
"T OFF" is momentarily displayed and the tuner goes to the T OFF mode.

The T OFF mode is maintained even when the power is turned OFF.

Cancelling the T OFF mode

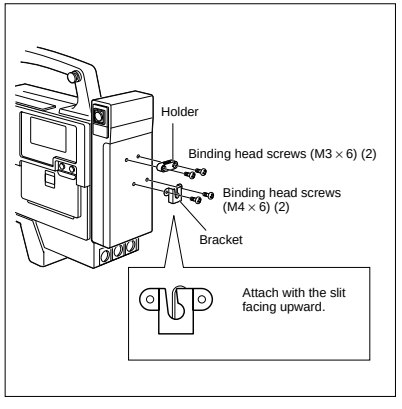
1 Turn the power ON while pressing and holding the GP and + buttons.

2 On the WRR-855A, release the buttons after the "HELLO" message appears. On the WRR-855B, release the buttons after the version number of your tuner appears.
"T ON" is momentarily displayed and the tuner resumes the normal status.

Attaching and Connecting to a Betacam

Use the Betacam attachment kit supplied with the BTA-801 Portable Tuner Mount Adapter.

1 Attach the holder and bracket to the Betacam.



Messages on the Display

In addition to the normal indications, the following messages may appear on the liquid-crystal display.

Messages	Contents	Measures
Err 01	An error occurred in backup memory data.	Contact your Sony dealer.
Err 02	The PLL synthesized circuit is in trouble.	
Err 03	The operating voltage exceeds the allowable value.	
TONE	As no tone signal is available or a tone signal other than 32.768 kHz is being received, the audio signal output is being muted.	Set the tuner to the T OFF mode (see page 13) to output the audio signal.
T OFF[a)]	The tuner is set in T OFF mode.	For details, see "Selecting and Releasing the T (Tone Squelch) OFF Mode" on page 12.

a) When the tuner is turned on, this message appears after "HELLO" on the WRR-855A. On the WRR-855B, the message appears after the version number of your tuner.
Subsequently, the tuner goes to the normal display status.

Specifications

Tuner section

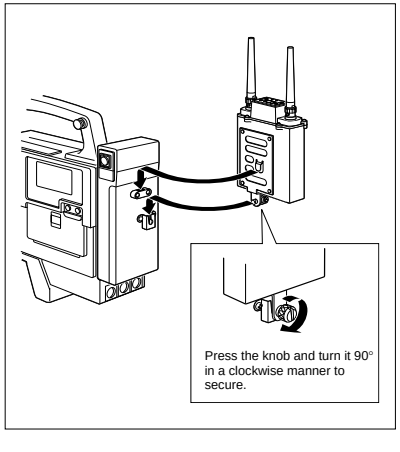
Type of reception: Space diversity
Circuit system: Dual conversion superheterodyne
Receiving frequencies
- Model available in USA: one frequency within a 24 MHz frequency band selected from 470 to 806 MHz
- Model available in Europe: one frequency within a 24 MHz frequency band selected from 470 to 862 MHz
- Model available in Australia: one frequency within 792 to 806 MHz

Local oscillators: 1st: Crystal controlled PLL synthesizer
2nd: Crystal oscillator
Antenna connectors: BNC-R type (2), 50 ohms
Selectivity: 60 dB or more (at ±250 kHz detuned)
Suprious rejection ratio: 70 dB or more
Image rejection ratio: 60 dB or more
Muting level: 10 dBμ (ON/OFF selectable)
De-emphasis: 50 μs
Frequency response: 50 to 15,000 Hz ±3.0 dB

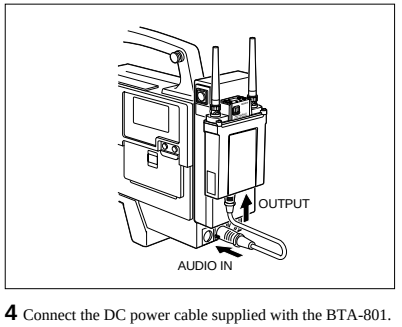
0 dBμ = 1 μVEMF
0 dBu = 0.775 Vrms

Attaching and Connecting to a Betacam

2 Align the attachment plate of the back of the BTA-801 with the holder and bracket.



3 Connect the output cable (optional).



4 Connect the DC power cable supplied with the BTA-801.

For the power cable connection, see page 8.

Specifications

Signal-to-noise ratio
(±5.0 kHz deviation at 1 kHz modulation)
30 dB or more at RF input level
10 dBμ (A-weighted)
60 dB or more at RF input level
60 dBμ (A-weighted)
Distortion: 1.0% or less (±40 kHz deviation at 1 kHz modulation)
Tone squelch frequency: 32.768 kHz
Output level: –40 dBu (±5.0 kHz deviation at 1 kHz modulation)
Output impedance: 25 ohms, unbalanced
Output connector: 15-pin D-sub connector (1)

General

Power requirements: DC 7 V (supplied from the BTA-801)
Operating voltage: DC 6.5 to 9.0 V
Current consumption: 200 mA DC or less (at DC 7 V)
Operating temperature: 0°C to +50°C (32°F to 122°F)
Storage temperature: –20°C to +60°C (–4°F to +140°F)
Dimensions: 88 × 118.8 × 31.3 mm (w/h/d) ($3^{1}/_{2} \times 4^{3}/_{4} \times 1^{1}/_{4}$ inches)
Mass: Approx. 280 g (9.9 oz) with the supplied antennas attached

Supplied accessories

Antennas (2)
Operating instructions (1)
Wireless Microphone System Frequency List (1)

Optional accessories

Portable Tuner Mount Adapter: BTA-801
Microphone cable (for Audio output cable):
EC-0.5C2-F (XLR-3-11C type ↔ XLR-3-11C type)
EC-0.5C2 (XLR-3-11C type ↔ XLR-3-12C type)

Design and specifications are subject to change without notice.

Sony Corporation

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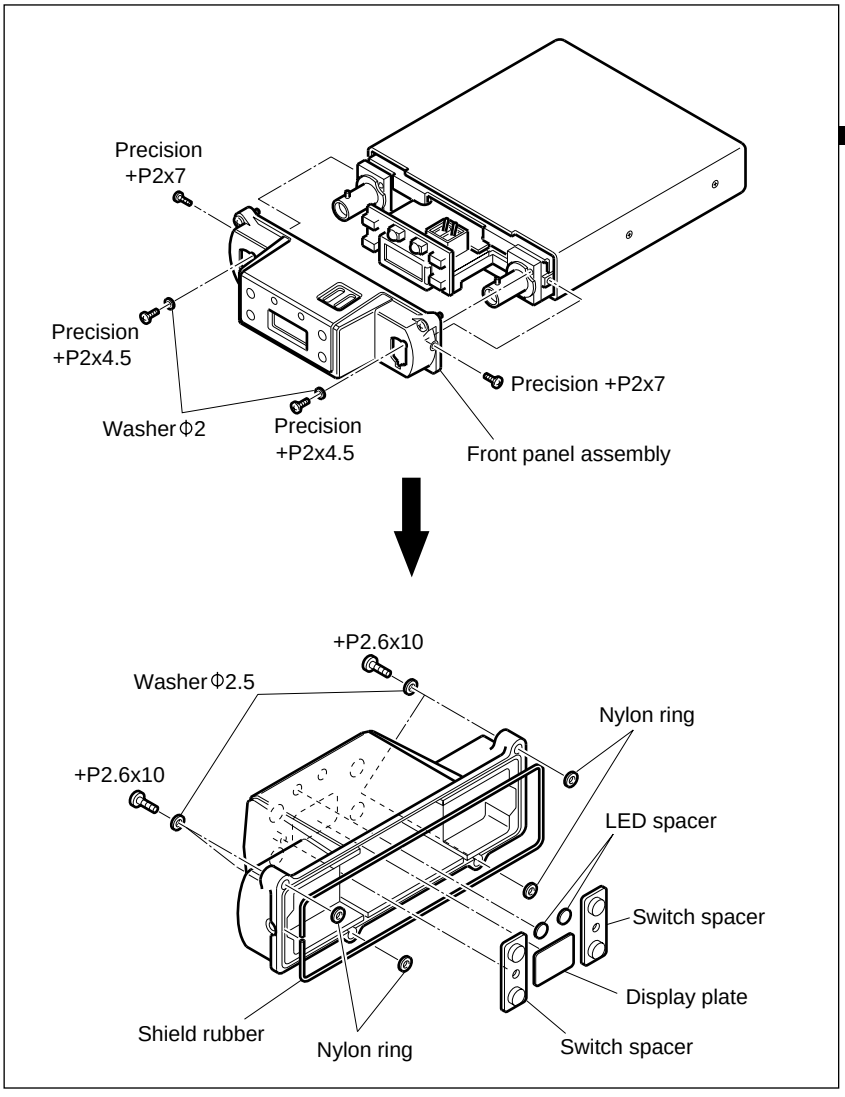
Section 2
Service Overview

2-1. Removal

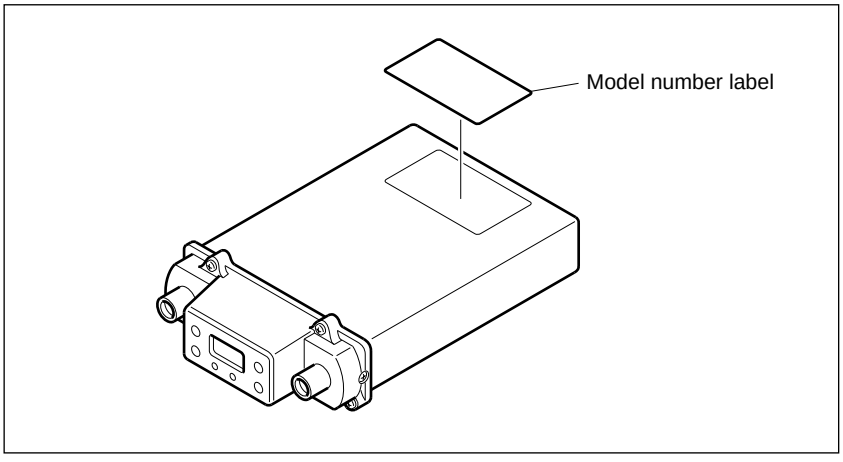
Front Panel Assembly



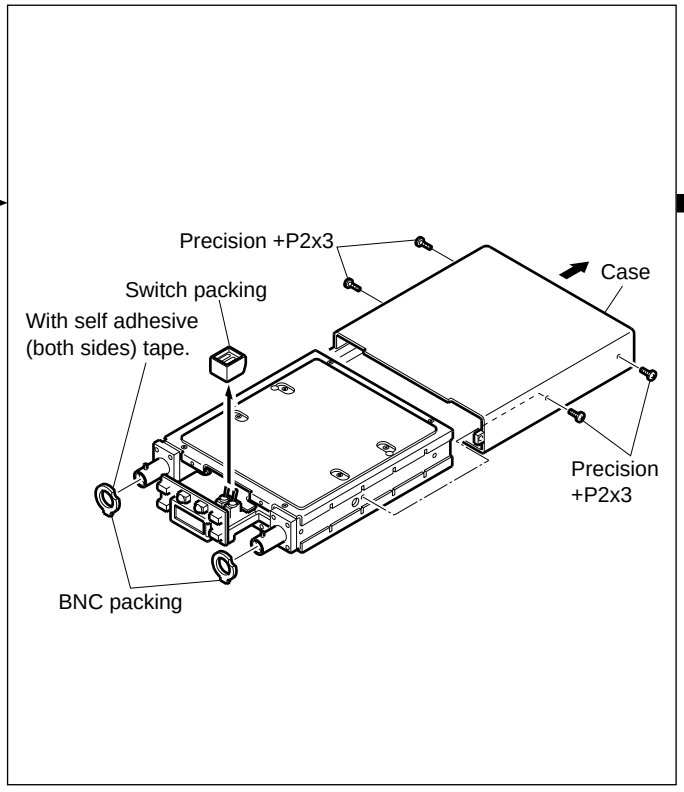
to page 2-2

to page 2-2

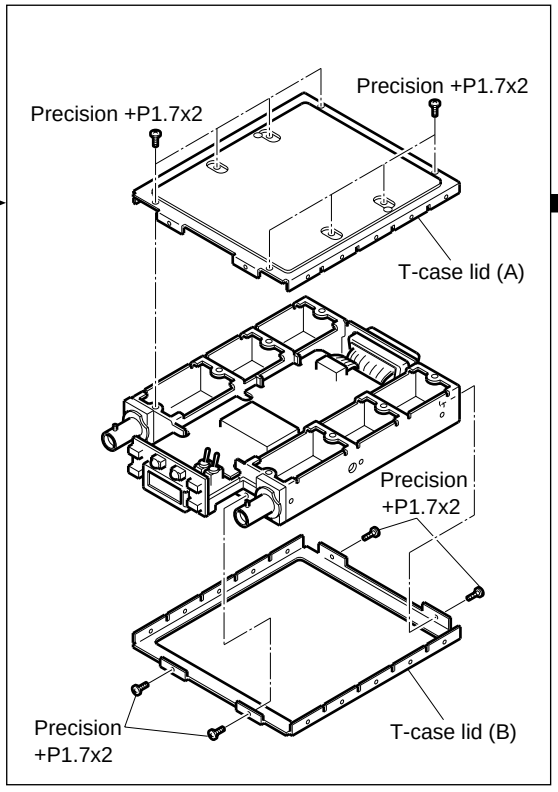
Model Number Label



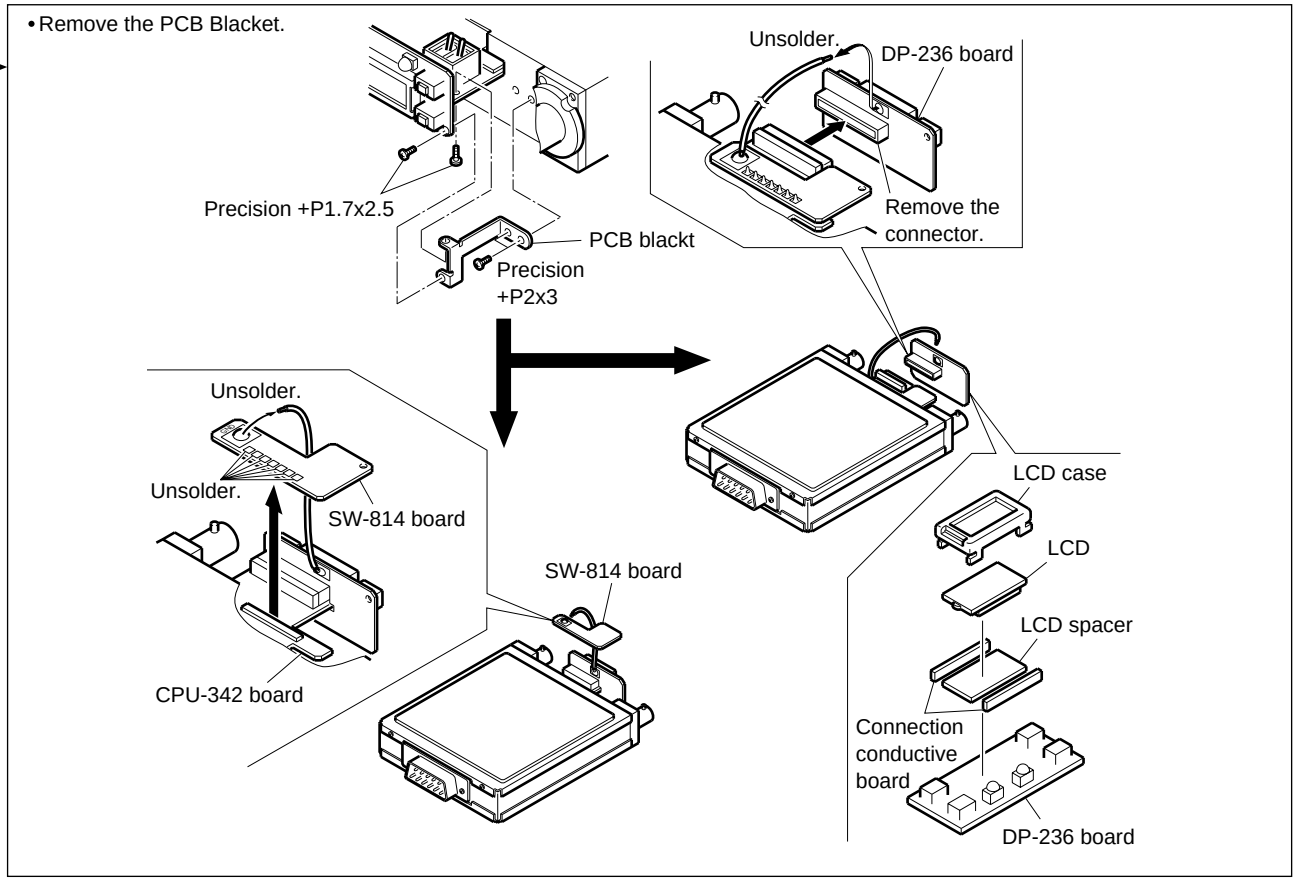
BNC Packing, Switch Packing, Case



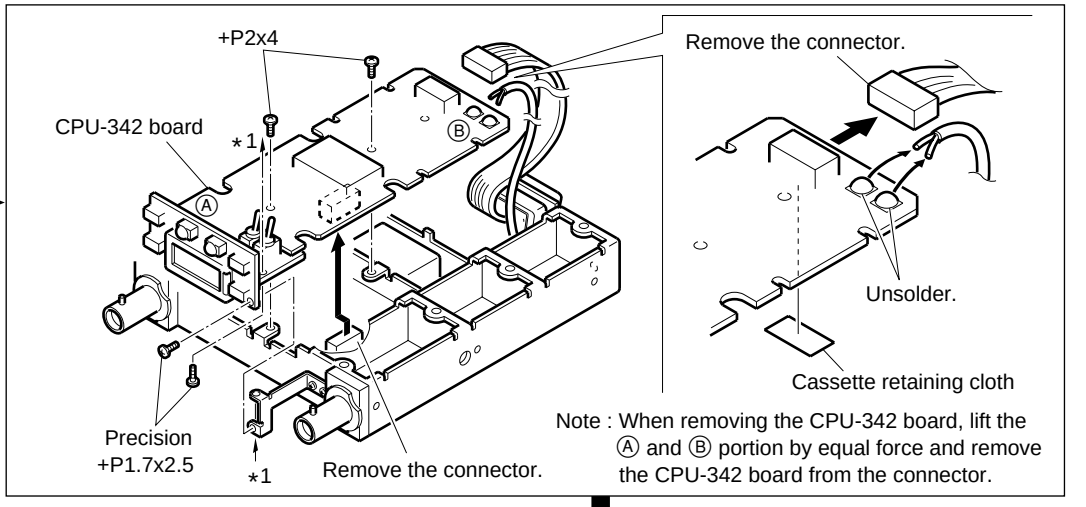
T-case Lid (A), T-case Lid (B)



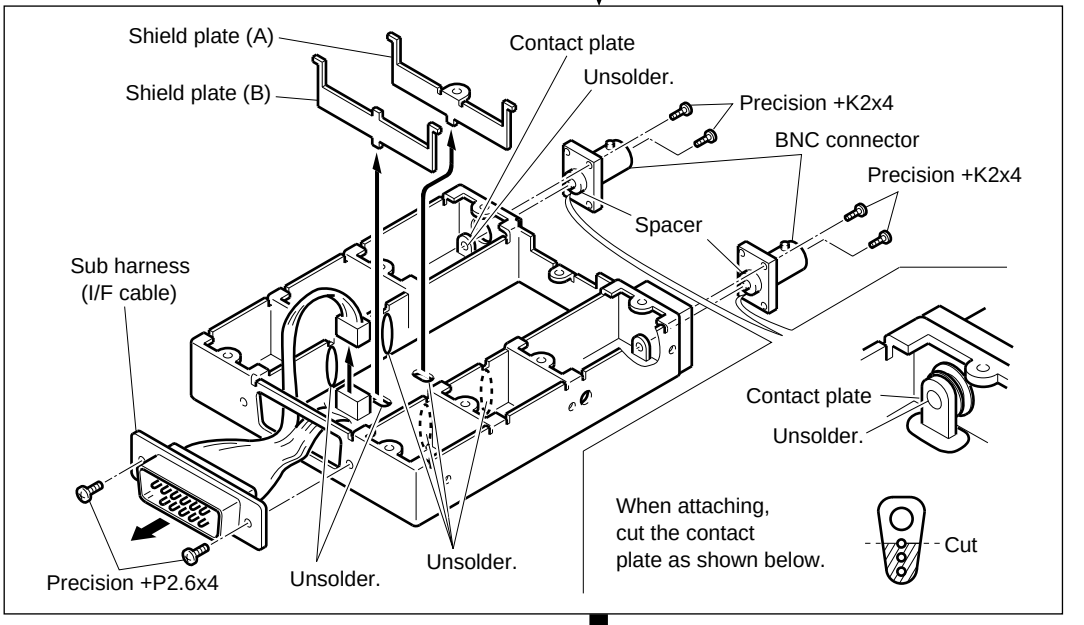
SW-814 Board, DP-236 Board, LCD



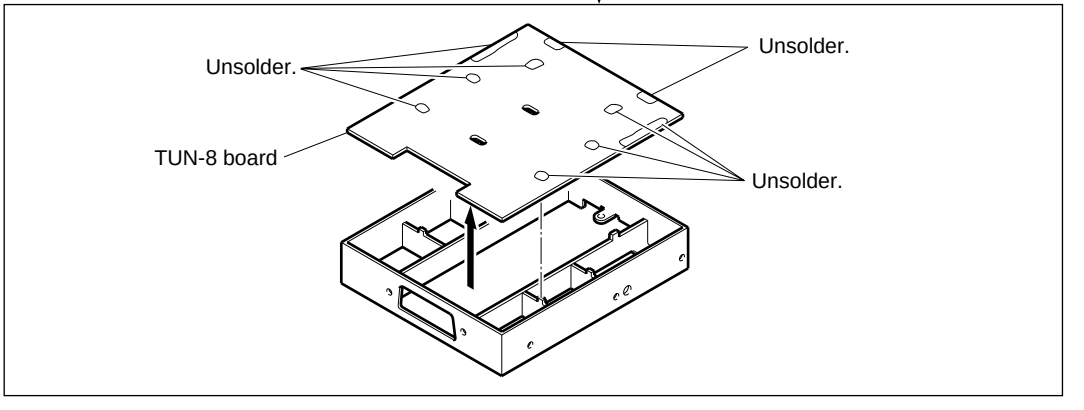
CPU-342 Board



BNC Connector, Sub harness (I/F Cable), Shield Plate (A), Shield Plate (B)



TUN-8 Board



2-2. Notes on Parts Replacement

2-2-1. Front Panel Assembly

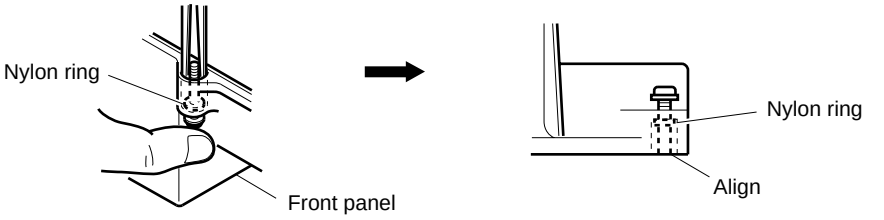
1. Replacing the Nylon Ring

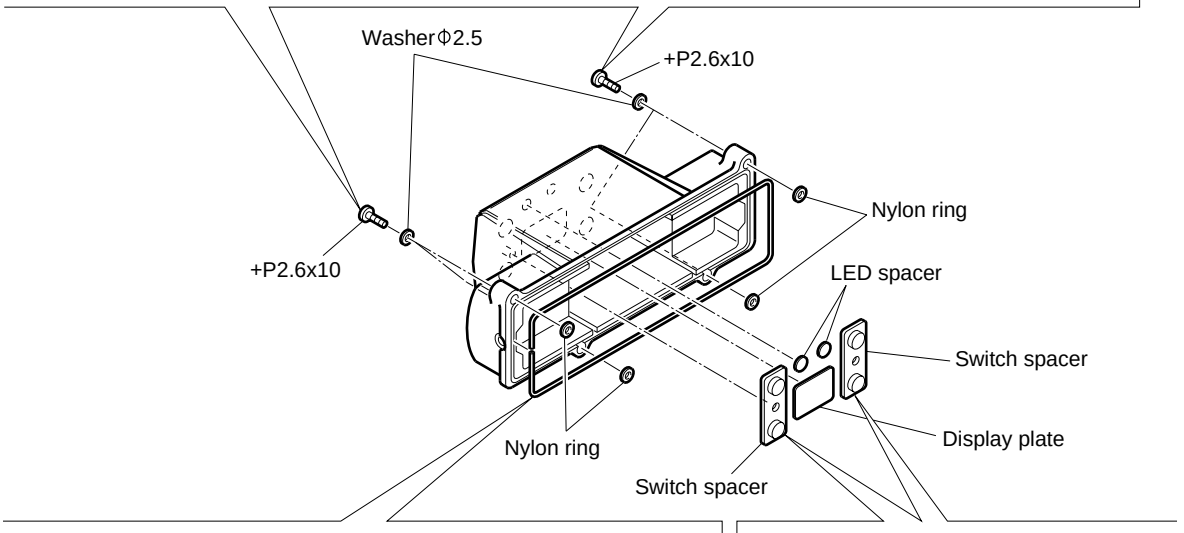
The WRR-855B is attached to a Camcorder or its adapter using four screws (+P2.6x10) on the front panel assembly. The nylon rings must therefore be attached to the correct position so that the these screws have the same length.

How to attach the nylon rings

① Push in a nylon ring to the deepest end using tweezers.

② Use a flat plane to align the tips of the screws with the front panel.





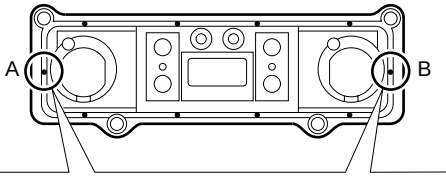
2. Replacing the Shield Rubber

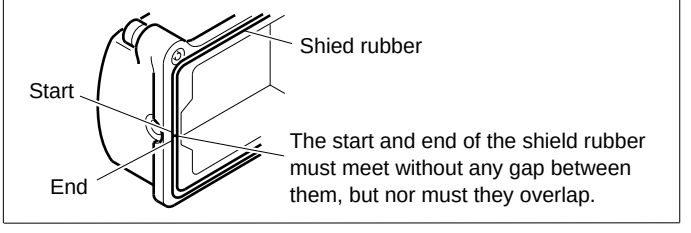
Replace the shield rubber as follows.

① Cut a length of shield rubber (min. 204 mm, preferably about 210 mm).

② Coat the ten locations marked with black round marks (●) in the following illustration with adhesive.
(approximately 0.1 ml (mg) for each location)
* Required adhesive : Loctite Prism 454 (commercially available)

③ Attach the shield rubber starting from either point A or B.
The start and end of the shield rubber must meet without any gap between them. Cut and remove the surplus length of the shield rubber.



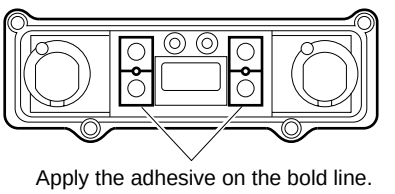

Shied rubber
Start
End
The start and end of the shield rubber must meet without any gap between them, but nor must they overlap.

3. Replacing the Switch Spacer

The switch spacer is used as drip-proof part. When replacing the switch spacer, follow the procedure below and attach it securely.

① Coat the area shown in the following illustration with adhesive.
* Required adhesive : Loctite Prism 454 (commercially available)

② While aligning the hole of the switch spacer with the protrusion of the front panel, attach the switch spacer on the front panel.
Note : Press the area of the switch spacer which is coated with adhesive for 5 seconds for each area (using the back of tweezers) until the switch spacer is firmly attached.



Apply the adhesive on the bold line.

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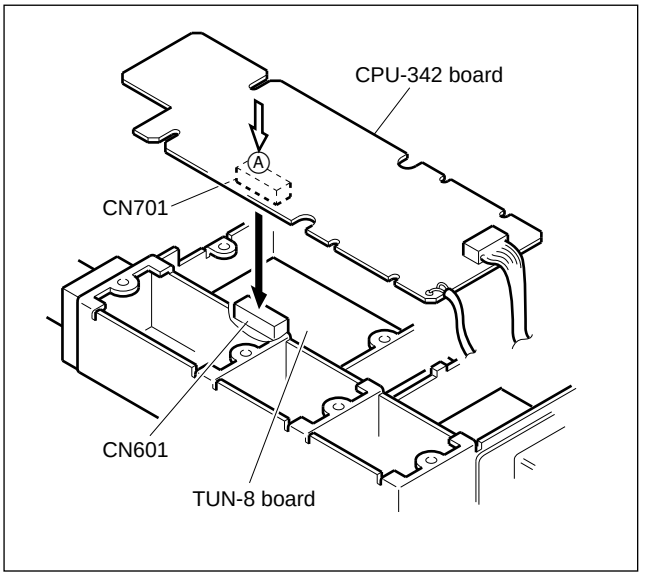
2-2-2. CPU-342 Mounted Circuit Board

1. When attaching the CPU-342 mounted circuit board into the unit, press the Ⓐ portion as shown below and insert the CPU-342 mounted circuit board into the connector (CN-601) of the TUN-8 mounted circuit board firmly so that the CPU-342 mounted circuit board is securely attached.



2-3. Precautions When Replacing EEPROM

On the EEPROM (IC702) mounted on the CPU-342 board, frequency data corresponding to each WRR-855B have been written. After replacing an EEPROM, it is necessary to write the corresponding frequency data to the new EEPROM.

2-4. Error Messages

The following error messages will appear if an error is detected by the built-in self diagnostics function of the WRR-855B.

Error Message	Contents	Countermeasure
Error01	Error in the backup memory.	Write the transmitting frequency data.
Error02	PLL synthesizer circuit failed.	Check the PLL synthesizer circuit (IC301, CP301 and its peripheral circuit) on the TUN-8 board.
Error03	The circuit voltage in the tuner unit assembly is abnormal.	Check the Q653, IC651/TUN-8 board and its peripheral circuit.
TONE	The tone signal is not present, or the audio signal output is muted because the receiver received a tone signal other than 32.768 MHz signal.	Refer to the section “Muting OFF Mode” in the Operation Manual.

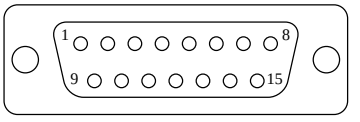
2-5. Service Functions

Set or release the muting function by operating the buttons on the front panel of the WRR-855B.

Function Name	Function	Setting Procedure	Release Procedure	Default Factory Setting
T OFF mode	Muting OFF by tone squelch	While pressing the GP and “-” key at the same time, turn on the power.	While pressing the GP and “+” key at the same time, turn on the power.	T OFF mode is released.

2-6. Connector Input/Output Signal

D-Sub 15-pin Male



Pin No.	Signal	Contents
1	GND	GND for AF output signal
2	AF OUTPUT	AF output signal (unbalanced type)
3	NC	No connection
4	DC +7V	Power supply input (+7Vdc)
5	GND	GND for power supply
6	REM	Remote (Internal /Ext) H: external
7	EXT SW	External power switch input H: power on
8	Digital GND	Digital I/O
9	I/F out (CLK)	Digital I/O
10	/F in (CS)	Digital I/O
11	I/F in (DI)	Digital I/O

Pin No.	Signal	Contents
12	I/F out (DO)	Digital I/O
13	NC	No connection
14	NC	No connection
15	NC	No connection

Section 3
Electrical Alignment

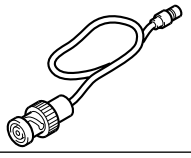
3-1. Preparation

3-1-1. Equipment and Tools

Equipment

Name	Specifications	Model name
Signal generator	Frequency range : 100 kHz to 990 MHz	HEWLETT PACKARD 8656B or equivalent
Spectrum analyzer	Frequency range : 10 kHz to 3 GHz	ADVANTEST TR4131 or equivalent
DC volt meter (Multi meter)	Effective digits: 3 1/2 digits	–
Audio analyzer (Distortion meter)	Frequency range : 10 Hz to 100 kHz Measurment range : 0.1 to 100%	HEWLETT PACKARD 334A or equivalent
RF millivolt meter	Frequency range : 10 kHz to 1000 MHz	MEGRO MV-19B, C (with 50 Ω termination prove chip MP-3109) or equivalent
Level meter	Frequency range : 20 Hz to 100 kHz	–
Noise meter	Frequency range : 10 Hz to 500 kHz Filter (Included) : A weighted filter	MEGRO MN-445B or equivalent
Tracking generator	Frequency range: 100 kHz to 2 GHz	ADVANTEST TR4153A or equivalent
Function generator	32.768 kHz ±1 Hz signal (sine wave) can be generated.	HEWLETT PACKARD 8904A or equivalent
Mic amp	Gain: 0 dB to 70 dB (with A-weighted filter)	–
Oscilloscope	Frequency range: DC to 30 MHz	–

Tools

Name	Part No.	Remarks
RF adjustment cable	J-6400-680-A	
Adjuster (0.4×1.3 mm)	7-721-052-81	For adjustment
Power supply/AF OUT connector	–	Refer to "How to make power supply/AF OUT connector".

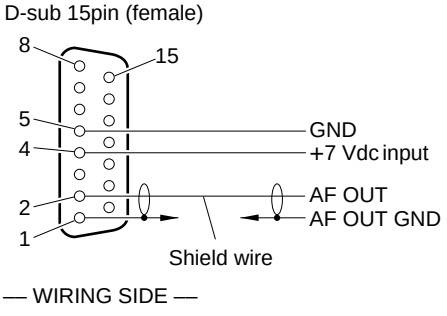
• How to make power supply/AF OUT connector

Parts Required

D-sub, 15 pin, female connector. (Part No.1-563-078-11)

To connect a measurement equipment and DC power supply to the WRR-855B D-sub connector, locally make the power supply/AF OUT connector as shown in the following diagram using a D-sub, 15 pin, female connector.

Wiring diagram



3-2. Adjustments

This section describes the following adjustment (and checks) required to satisfy the specifications.

Adjustment Item

3-2-1. TUN-8 Board Adjustment
1. Front-end Adjustment
2. 1st Local Adjustment
3. IF Adjustment
4. Muting Level and RF Level Adjustment
5. FM Detector Adjustment
6. Output Level Adjustment
7. S/N Check
8. Noise Squelch Check
9. Tone Squelch Check

3-2-2. Overall Characteristic Confirmation
1. Current Consumption Check
2. S/N Check
3. Frequency Caracteristic Check
4. Distortion Ratio Check
5. RF Input Level Indication Check
6. AF Indicator Check

Note

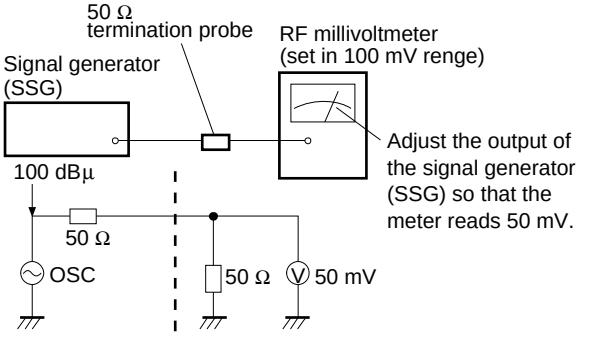
0 dB μV_{EMF} = −113 dBm
EMF: Electromotive force
0 dBm = 1 mW at 50 Ω loaded

Note on Adjustment

The RF level of the input signal (the output level of the signal generator) for adjustment is expressed as an open ended voltage in unit dBμ (where 0 dBμ= 1 μV). The adjustment is to be carried out by calibrating the output level of the signal generator as shown below.

Calibration Method

(1) Connect the RF milivoltmeter to the signal generator as shown in the figure below.



(2) Adjust the level of the output signal from the signal generator (SSG) so that the RF millivoltmeter reads 50 mV. The level of the output signal from the signal generator (SSG) when the RF millivoltmeter reads 50 mV shall be specified as 100 dBμ (at no load).

3-2-1. TUN-8 Board Adjustment

Preparation

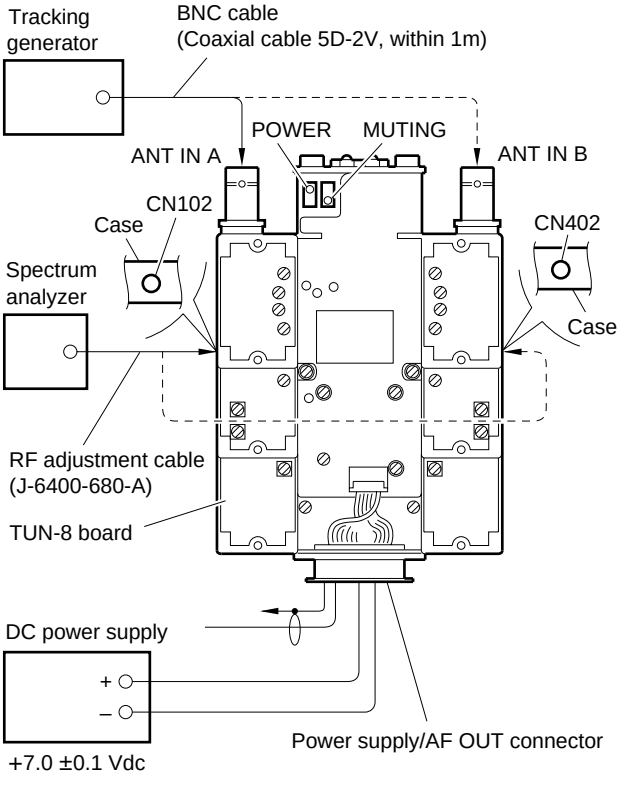
Before the adjustments, perform the followings.
- Remove the case and front panel.
- Remove the case lid (Precision +P1.7×2: 8) of the unit assembly. (Refer to the "2-1. Removal".)

1. Front-end Adjustment

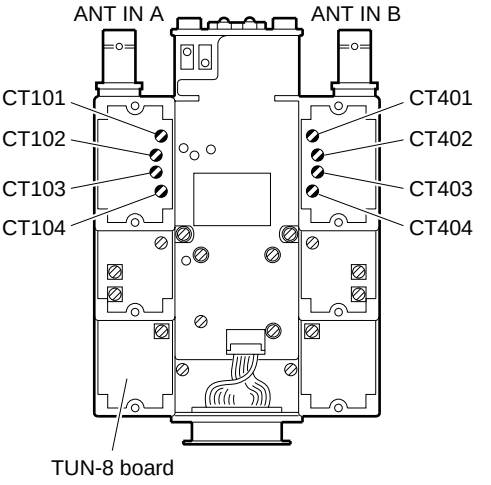
Equipment and Tools

- DC power supply +7.0 ±0.1 Vdc
- Spectrum analyzer
- RF adjustment cable (Part No. J-6400-680-A)
- Adjuster (0.4×1.3 mm) : 1 (Part No. 7-221-652-81)
- Power supply/AF OUT connector
  (Refer to the "How to make power supply/AF OUT connector" on page 3-1.)

Connection



Adjustment Location



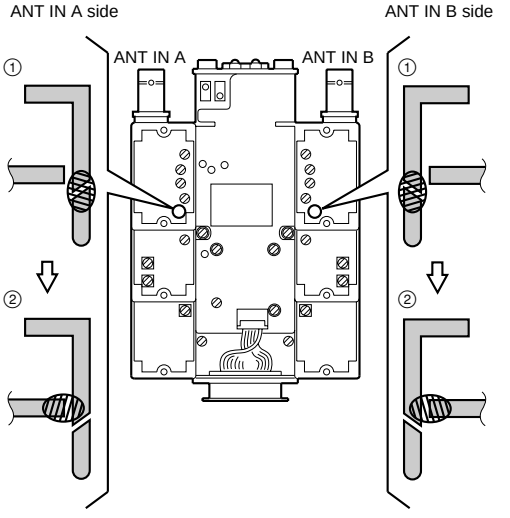
Switch and Control Setting

Channel setting:

CE21 model; Group 00, 22-32 channel (482.000 MHz)
CE33 model; Group 00, 34-32 channel (578.000 MHz)
CE62 model; Group 00, 63-32 channel (810.000 MHz)
CE67 model; Group 00, 68-32 channel (850.000 MHz)
U14 model; Group 00, 16-01 channel (482.125 MHz)
U30 model; Group 00, 32-01 channel (578.125 MHz)
U62 model; Group 00, 64-01 channel (770.125 MHz)
U66 model; Group 00, 68-01 channel (794.125 MHz)

Procedure

Step1: Preparation
Turn off the POWER switch of the WRR-855B, and change the position of the soldering bridge to the printed slit land on the TUN-8 board from ① to ② as shown below.



Step2: Adjustment

(1) Connect the tracking generator to the ANT IN A connector of the TUN-8 board.

(2) Connect the spectrum analyzer to the CN102 connector of the TUN-8 board using the RF adjustment cable.

(3) Set the tracking generator and spectrum analyzer as follows:

Tracking generator setting

OUT PUT level: −30±0.1 dBm

Out put level setting is to be performed by connecting the tracking generator directly to the spectrum analyzer.

Spectrum analyzer setting

CENTER FREQUENCY:

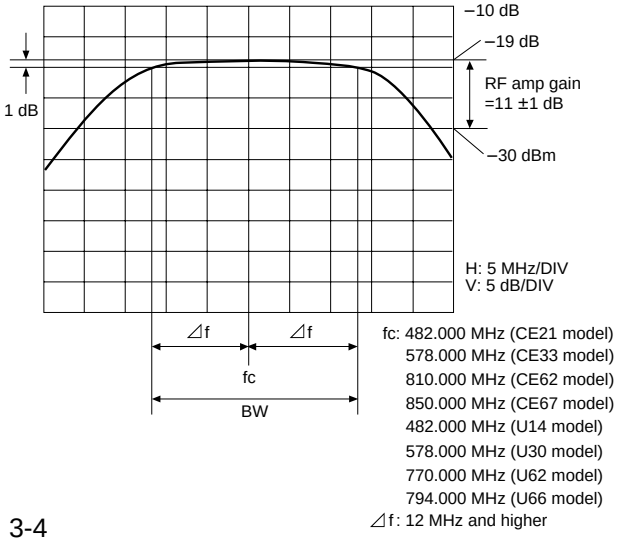
CE21 model; 482.000 MHz
CE33 model; 578.000 MHz
CE62 model; 810.000 MHz
CE67 model; 850.000 MHz
U14 model; 482.000 MHz
U30 model; 578.000 MHz
U62 model; 770.000 MHz
U66 model; 794.000 MHz

REF (Reference) LEVEL : −10 dBm
FREQUENCY SPAN : 50 MHz (5 MHz/DIV)
AMPLITUDE SCALE : 5 dB/DIV
ATT (Input attenuation) : 10 dB
RBW (Resolution per bond width) : 100 MHz
VBW (Video band width) : 30 kHz

(4) Adjustment (ANT IN A side)

Specification : RF Amplifier gain = 11 ±1 dB
Band width (BW) = ±12 MHz or more (within 1 dB according to the center frequency level)

Adjustment : Alternately ⊘CT101, CT102, CT103 and CT104/TUN-8 board



(5) Connect the tracking generator to the ANT IN B connector of the TUN-8 board.

(6) Connect spectrum analyzer to the CN402 connector of the TUN-8 board.

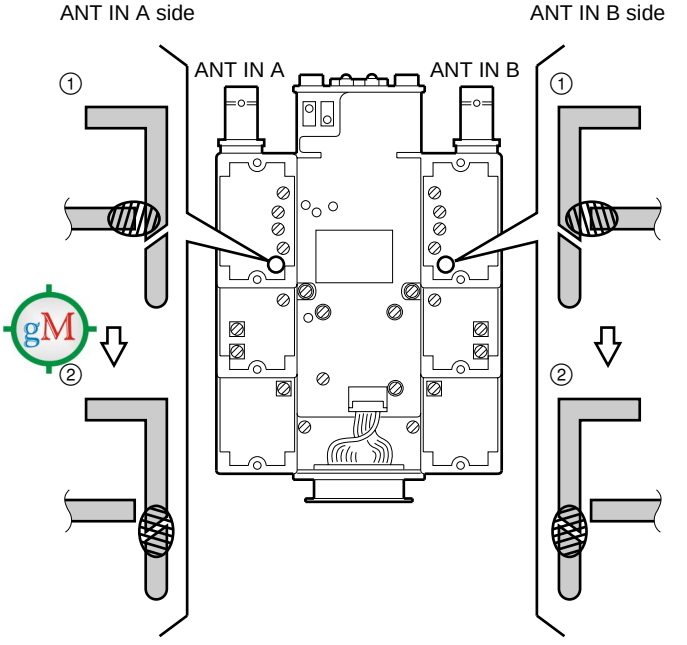
(7) Adjustment (ANT IN B block)

Specification : The same as procedure (4) above.

Adjustment : Alternately ⊘CT401, CT402, CT403 and CT404/TUN-8 board

Step3: Works after completing adjustment

After completing adjustment, turn off the main power of the WRR-855B, and change the soldering bridge of the slit land of the TUN-8 board as shown below. (① → ②)

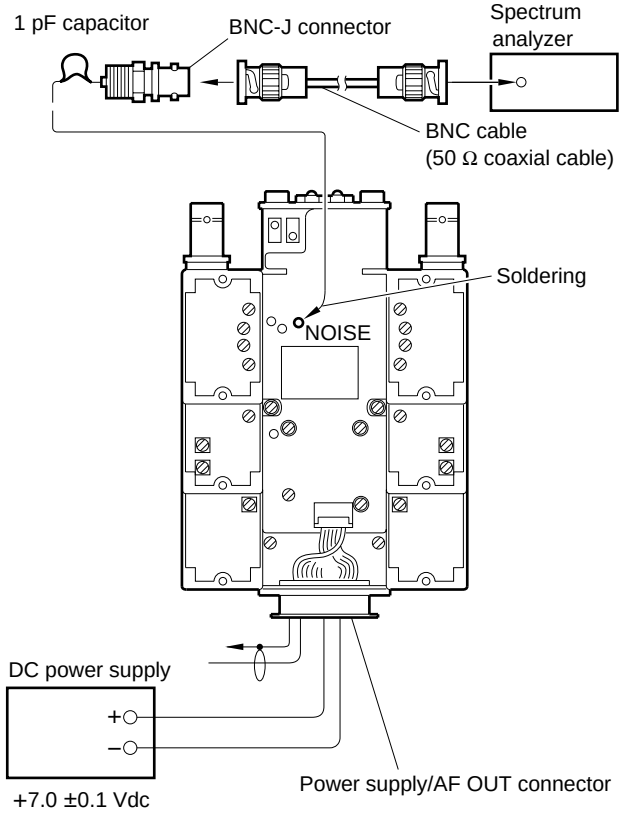


2. 1st Local Adjustment

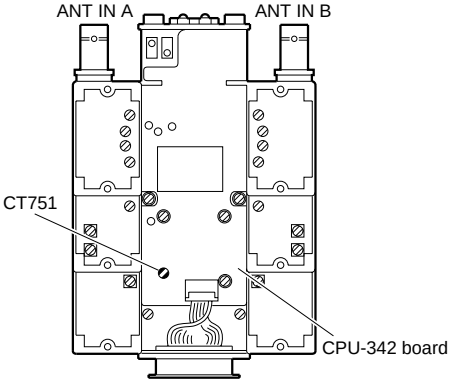
Equipment and Tools

- DC power supply: +7.0 ±0.1 Vdc
- Spectrum analyzer
- Adjuster (0.4×1.3 mm) : 1 (Part No. 7-221-652-81)
- Ceramic capacitor 1 pF (Part No. 1-102-934-00)
- Power supply/AF OUT connector
  (Refer to the "How to make power supply/AF OUT connector" on page 3-1).

Connection



Adjustment Location



Switch and Control Setting

Channel setting:

CE21 model; Group 00, 22-32 channel (482.000 MHz)
CE33 model; Group 00, 34-32 channel (578.000 MHz)
CE62 model; Group 00, 63-32 channel (810.000 MHz)
CE67 model; Group 00, 68-32 channel (850.000 MHz)
U14 model; Group 00, 16-01 channel (482.125 MHz)
U30 model; Group 00, 32-01 channel (578.125 MHz)
U62 model; Group 00, 64-01 channel (770.125 MHz)
U66 model; Group 00, 68-01 channel (794.125 MHz)

MUTING: OFF

Adjustment Procedure

(1) Set the spectrum analyzer as follows:
CENTER FREQUENCY :
CE21 model; 632.750 MHz
CE33 model; 728.750 MHz
CE62 model; 960.750 MHz
CE67 model; 1000.750 MHz
U14 model; 632.875 MHz
U30 model; 728.875 MHz
U62 model; 920.875 MHz
U66 model; 944.875 MHz

Note

Perform the center frequency setting by using the signal generator.
REFERENCE LEVEL : −10 dBm
FREQUENCY SPAN : 50 kHz (5 kHz/DIV)
AMPLITUDE SCALE : 10 dB/DIV
ATT (Input attenuator) : 0 dB

(2) Connect the spectrum analyzer probe to the NOISE- terminal (land) of the CPU-342 board with 1 pF ceramic capacitor.

(3) Adjust the ⊘CT751/CPU-342 board under condition (2) above so that the frequency meets the specification below.

Specification:

CE21 model; 632.750 MHz ±5 kHz
CE33 model; 728.750 MHz ±5 kHz
CE62 model; 960.750 MHz ±5 kHz
CE67 model; 1000.750 MHz ±5 kHz
U14 model; 632.875 MHz ±5 kHz
U30 model; 728.875 MHz ±5 kHz
U62 model; 920.875 MHz ±5 kHz
U66 model; 944.875 MHz ±5 kHz

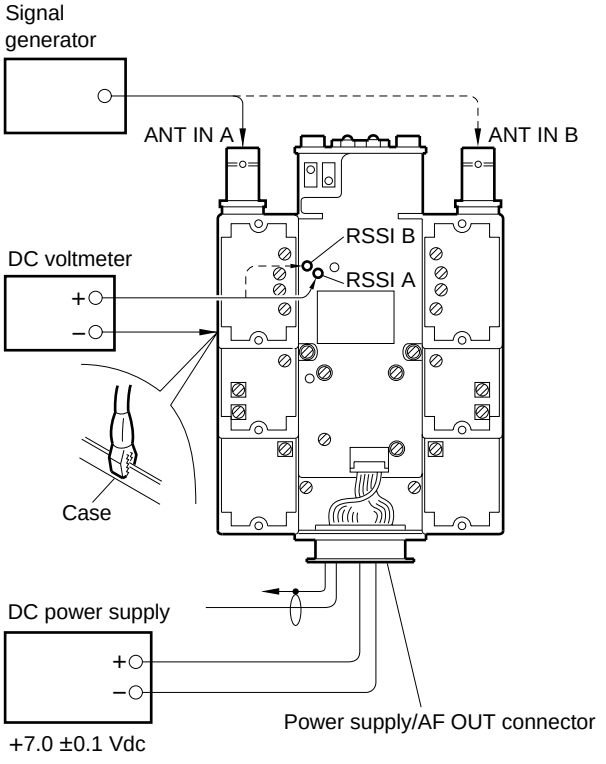
Adjustment: ⊘CT751/CPU-342 board

3. IF Adjustment

Equipment and Tools

- DC power supply: +7.0 ±0.1 Vdc
- Signal generator
- DC voltmeter (Digital multimeter)
- Adjuster (0.4×1.3 mm): 1 (Part No. 7-221-652-81)
- Power supply/AF OUT connector
  (Refer to the "How to make power supply/AF OUT connector" on page 3-1.)

Connection



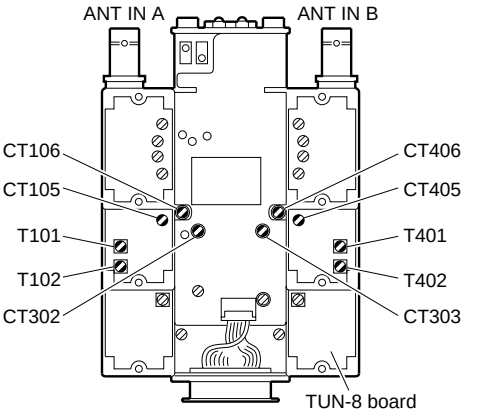
Switch and Control Setting

Channel setting:

CE21 model; Group 00, 22-32 channel (482.000 MHz)
CE33 model; Group 00, 34-32 channel (578.000 MHz)
CE62 model; Group 00, 63-32 channel (810.000 MHz)
CE67 model; Group 00, 68-32 channel (850.000 MHz)
U14 model; Group 00, 16-01 channel (482.125 MHz)
U30 model; Group 00, 32-01 channel (578.125 MHz)
U62 model; Group 00, 64-01 channel (770.125 MHz)
U66 model; Group 00, 68-01 channel (794.125 MHz)

MUTING: OFF

Adjustment Location



Procedure

Step1: ANT IN A side adjustment

(1) Connect the signal genarator to the ANT IN A connector.
(2) Connect the DC voltmeter to the RSSI (A) terminal (land) of the CPU-342 board.
(3) Set the signal generator as follows:
Signal genarator setting
FREQUENCY (Carrier frequency) :
CE21 model; 482.000 MHz
CE33 model; 578.000 MHz
CE62 model; 810.000 MHz
CE67 model; 850.000 MHz
U14 model; 482.125 MHz
U30 model; 578.125 MHz
U62 model; 770.125 MHz
U66 model; 794.125 MHz

RF OUTPUT (Output level) : 30 dBμ (= −83 dBm)
Set (Calibrate) the output level by using the RF voltmeter. (Refer to "Calibration method" on page 3-2.)
MODULATION (Modulation frequency) : OFF (No modulation)

(4) Adjustment
Specification : RSSI (A) terminal voltage = Maximum (approx. 1.6 Vdc or more)
Adjustment : ⊘CT105, CT106, CT302, T101 and T102/TUN-8 board.
Adjust the CT105, CT106 and CT302 alternateley.

(5) When the voltage of RSSI (A) is get maximum level in procedure (4), set the output level of the signal generator to 10 dBμ (= −103 dBm) .
(6) Perform the procedure (4) above.
Specification : RSSI (A) terminal voltage = Maximum (1.3 Vdc or more)

Step2: ANT IN B side adjustment

(1) Connect the signal generator to the ANT IN B connector.
(2) Connect the DC voltmeter to the RSSI (B) terminal of the CPU-342 board.
(3) Perform the procedures (3) through (6) in step 1 above. Perform the same adjustment with the components listed below on the right.

ANT IN A side		ANT IN B side
⊘CT105, CT106,CT302, T101 and T102 /TUN-8 board	→	⊘CT405, CT406, CT303 T401 and T402 /TUN-8 board
RSSI (A)	→	RSSI (B)

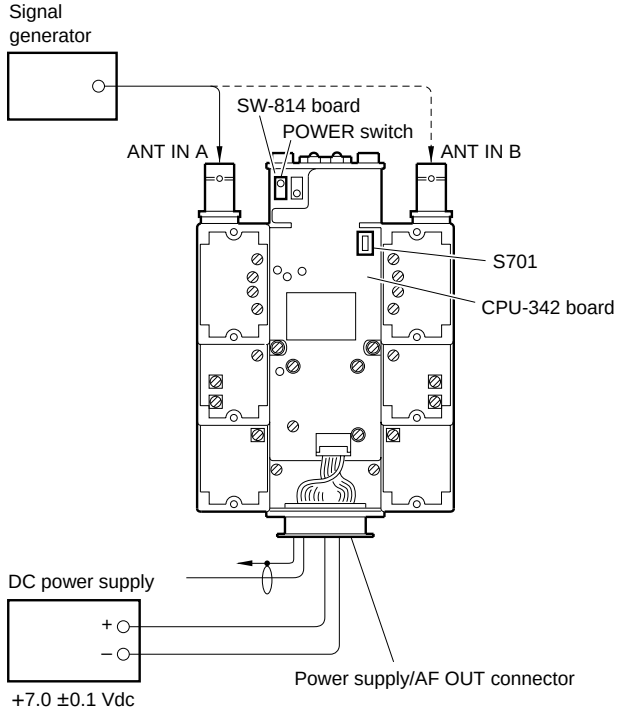
4. Muting Level and RF Level Adjustment

This adjustment is performed automatically by the learning function of the WRR-855B (RSSI learning).

Equipment and Tools

- DC power supply: + 7.0±0.1 Vdc
- Signal generator
- Power supply/AF OUT connector
  (Refer to the "How to make power supply/AF OUT connector" on page 3-1.)

Connection



Switch and Control Setting

Channel setting: Any channel setting

MUTING: OFF

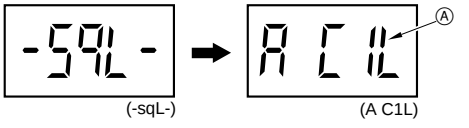
Procedure

Step1: Set the signal generator as follows:

Signal generator setting
FREQUENCY (Carrier frequency):
CE21 model; 471.000 MHz
CE33 model; 567.000 MHz
CE62 model; 799.000 MHz
CE67 model; 839.000 MHz
U14 model; 471.000 MHz
U30 model; 567.000 MHz
U62 model; 759.000 MHz
U66 model; 783.000 MHz
RF OUTPUT (Output level): 30 dBμV_{EMF} (= −83 dBm)
MODULATION (Modulation frequency) : OFF (No modulation)

Step2: Adjustment

(1) Connect the signal generator to the ANT IN A connector.
(2) Turn OFF the POWER switch (S901 switch on the SW-814 board).
(3) Set the RF OUTPUT (output level) of the signal generator to the OFF.
(4) Turn ON the POWER switch (S901 switch on the SW-814 board) with the S701 switch on the CPU-342 board.
(5) Indication on LCD (display) appears as follows:
LCD :



(6) Set the RF OUTPUT (output level) of the signal generator to the ON.

(7) Check first that indication "L" (after the frequency indication) on the LCD has disappeared, and then press the S701 switch on the CPU-342 board.

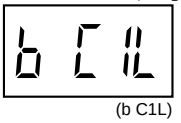
Note

If the "L" indication does not disappear from the LCD (on "A" area: refer to the previous step (5)) (when the RF input level is lower than the reference level) or "H" is displayed (when the RF input level is higher than the reference level) , perform the following adjustment.

① Check the RF output level and frequency of the signal generator (perform re-setting if necessary), and repeat from step (1).

② If the above conditions (the "L" indication does not disappear, or "H" is displayed) remain even after re-adjustment, perform the "3-2-1. TUN-8 Board Adjustment" from item 1 to item 3.

(8) Indication on LCD (display) appears as follows:

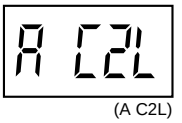
LCD : 

(b C1L)

(9) Connect the signal generator to the ANT IN B connector.

(10) Check first that indication "L" (after the frequency indication) on LCD has disappeared, and then press the S701 switch on the CPU-342 board.

(11) Indication on LCD (display) appears as follows:

LCD : 

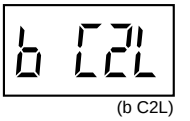
(A C2L)

(12) Following the guide shown under (11) , connect the signal generator to the ANT IN A connector.
Set the FREQUENCY (carrier frequency) of the signal generator as follows:

CE21 model; 482.000 MHz
CE33 model; 578.000 MHz
CE62 model; 810.000 MHz
CE67 model; 850.000 MHz
U14 model; 482.000 MHz
U30 model; 578.000 MHz
U62 model; 770000 MHz
U66 model; 794.000 MHz

(13) Check first that indication "L" (after the frequency indication) on LCD has disappeared, and then press the S701 switch on the CPU-342 board.

(14) Indication on LCD (display) appears as follows:

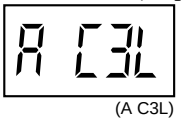
LCD : 

(b C2L)

(15) Connect the signal generator to the ANT IN B connector.

(16) Check first that indication "L" (after the frequency indication) on LCD has disappeared, and then press the S701 switch on the CPU-342 board.

(17) Indication on LCD (display) appears as follows:

LCD : 

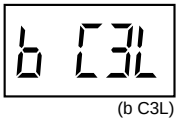
(A C3L)

(18) Following the guide shown under (17) , connect the signal generator to the ANT IN A connector. Set the FREQUENCY (carrier frequency) of the signal generator as follows:

CE21 model; 493.000 MHz
CE33 model; 589.000 MHz
CE62 model; 821.000 MHz
CE67 model; 861.000 MHz
U14 model; 493.000 MHz
U30 model; 589.000 MHz
U62 model; 781.000 MHz
U66 model; 805.000 MHz

(19) Check first that indication "L" (after the frequency indication) on LCD has disappeared, and then press the S701 switch on the CPU-342 board.

(20) Indication on LCD (display) appears as follows:

LCD : 

(b C3L)

(21) Following the guide shown under (20) , connect the signal generator to the ANT IN B connector.

(22) Check first that indication "L" (after the frequency indication) on LCD has disappeared, and then press the S701 switch on the CPU-342 board.

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(23)Indication on LCD (display) appeares as follows:

Model	LCD indication
CE21	CE21
CE33	CE33
CE62	CE62
CE67	CE67
U14	U14
U30	U30
U62	U62
U66	U66

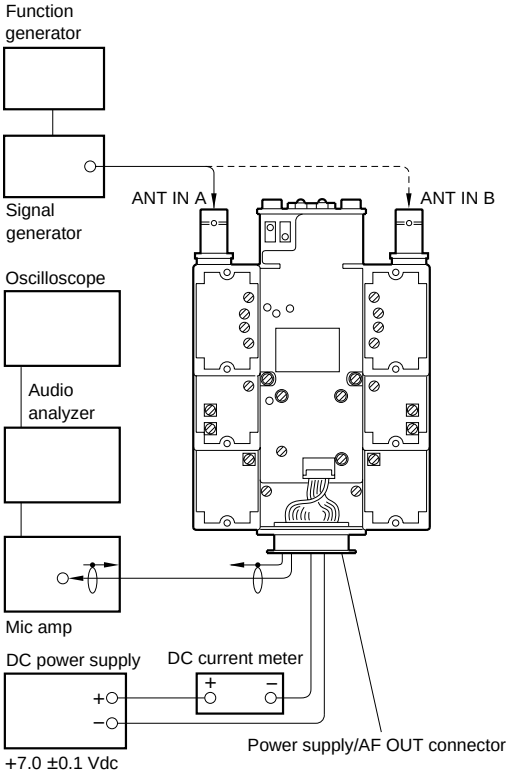
Adjustment is completed. (Nomal operation mode)

5. FM Detector Adjustment

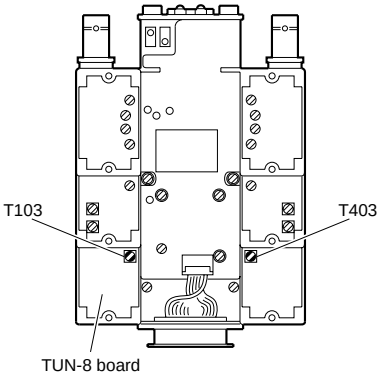
Equipment and Tools

- DC power supply: +7.0 ±0.1 Vdc
- Signal generator
- Audio analyzer (Level meter, distortion meter)
- MIC amp (Noise meter)
- Oscilloscope
- Adjuster (0.4×1.3 mm) : 1 (Part No. 7-221-652-81)
- Power supply/AF OUT connector
  (Refer to the "How to make power supply/AF OUT connector" on page 3-1.)

Connection



Adjustment Location



Switch and Control Setting

Channel setting:
- CE21 model; Group 00, 22-32 channel (482.000 MHz)
- CE33 model; Group 00, 34-32 channel (578.000 MHz)
- CE62 model; Group 00, 63-32 channel (810.000 MHz)
- CE67 model; Group 00, 68-32 channel (850.000 MHz)
- U14 model; Group 00, 16-01 channel (482.125 MHz)
- U30 model; Group 00, 32-01 channel (578.125 MHz)
- U62 model; Group 00, 64-01 channel (770.125 MHz)
- U66 model; Group 00, 68-01 channel (794.125 MHz)

MUTING: OFF

Procedure

(1) Connect the Audio analyzer to the AF OUT (power supply/AF OUT connector) of D-sub 15 pin connector via the MIC amp.
(2) Connect the signal genarator to the ANT IN A connector, and set the signal generator as follows:
Signal generator setting
FREQUENCY (Carrier frequency) :
- CE21 model; 482.000 MHz
- CE33 model; 578.000 MHz
- CE62 model; 810.000 MHz
- CE67 model; 850.000 MHz
- U14 model; 482.125 MHz
- U30 model; 578.125 MHz
- U62 model; 770.125 MHz
- U66 model; 794.125 MHz

RF OUTPUT (Output level): 60 dBμV_{EMF} (= −53 dBm)
MODULATION : 1 kHz
DEVIATION : ±40 kHz

ANT IN A side Adjustment
(3) Adjustment
Specification : AF output level = Maximum
Adjustment : ⊘T103/TUN-8 board
(4) Set the audio analyzer to distortion meter mode.
(5) Adjustment
Specification : Distortion ratio = Minimum (0.8 % or less)
Adjustment : ⊘T103/TUN-8 board
Adjust ⊘T103 finely.

ANT IN B side Adjustment
(6) Connect the signal generator to the ANT IN B connector. (Set the same setting as procedure (1) above for spectrum analyzer).
(7) Perform the procedures (2) , (3) and (4) above,
Adjustment : ⊘T403/TUN-8 board
Adjust ⊘T403 finely.

6. Output Level Adjustment

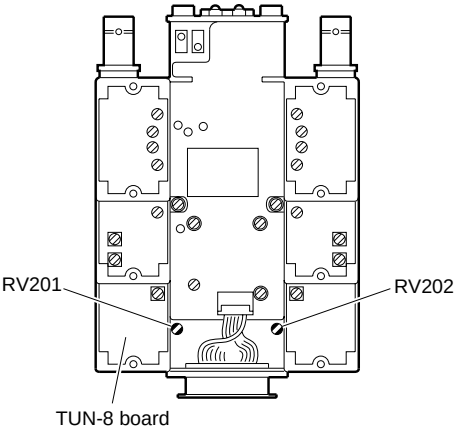
Equipment and Tools

- DC power supply: +7.0 ±0.1 Vdc
- Audio analyzer (level meter, distortion meter)
- MIC amp (Noise meter)
- Oscilloscope
- Adjuster (0.4×1.3 mm) : 1 (Part No. 7-221-652-81)
- Power supply/AF OUT connector
(Refer to the "How to make power supply/AF OUT connector" on page 3-1.)

Connection

Same as "5. FM Detector Adjustment".

Adjustment Location



Switch and Control Setting

Channel setting:
CE21 model; Group 00, 22-32 channel (482.000 MHz)
CE33 model; Group 00, 34-32 channel (578.000 MHz)
CE62 model; Group 00, 63-32 channel (810.000 MHz)
CE67 model; Group 00, 68-32 channel (850.000 MHz)
U14 model; Group 00, 16-01 channel (482.125 MHz)
U30 model; Group 00, 32-01 channel (578.125 MHz)
U62 model; Group 00, 64-01 channel (770.125 MHz)
U66 model; Group 00, 68-01 channel (794.125 MHz)

MUTING: OFF

Procedure

(1) Connect the audio analyzer to the AF OUT (power supply/AF OUT connector) of D-sub 15 pin connector via the MIC amp.
(2) Connect the signal genarator to the ANT IN A connector, and set the Signal generator as follows:
Signal generator setting
FREQUENCY (Carrier frequency) :
CE21 model; 482.000 MHz
CE33 model; 578.000 MHz
CE62 model; 810.000 MHz
CE67 model; 850.000 MHz
U14 model; 482.125 MHz
U30 model; 578.125 MHz
U62 model; 770.125 MHz
U66 model; 794.125 MHz

RF OUTPUT (output level) : 60 dBμV_{EMF}
(= −53 dBm)
MODULATION : 1 kHz
DEVIATION : ±5 kHz
(3) Adjustment (ANT IN A side adjustment)
Specification : Output level
(level meter indication level) =
−40 dBm± 0.2 dB (600 Ω loaded)
Adjustment : ⊘RV201/TUN-8 board
(4) Connect the signal generator to the ANT IN B connector.
(5) Adjustment (ANT IN B side adjustment)
Specification : Output level
(level meter indication level) =
−40 dBm ± 0.2 dB (600 Ω loaded)
Adjustment : ⊘RV202/TUN-8 board

Note
The output level difference between the ANT IN A side and the ANT IN B side should be within 0.3 dB.

7. S/N Check

Equipment and Tools

- DC power supply: +7.0 ±0.1 Vdc
- Audio analyzer (level meter, distortion meter)
- MIC amp (Noise meter) with A-weighted filter
- Oscilloscope
- Adjuster (0.4×1.3 mm) : 1 (Part No. 7-221-652-81)
- Power supply/AF OUT connector
(Refer to the "How to make power supply/AF OUT connector" on page 3-1.)

Connection

Same as "5. FM Detector Adjustment".

Switch and Control Setting

Channel setting:
CE21 model; Group 00, 22-32 channel (482.000 MHz)
CE33 model; Group 00, 34-32 channel (578.000 MHz)
CE62 model; Group 00, 63-32 channel (810.000 MHz)
CE67 model; Group 00, 68-32 channel (850.000 MHz)
U14 model; Group 00, 16-01 channel (482.125 MHz)
U30 model; Group 00, 32-01 channel (578.125 MHz)
U62 model; Group 00, 64-01 channel (770.125 MHz)
U66 model; Group 00, 68-01 channel (794.125 MHz)

MUTING: OFF

Procedure

(1) Connect the audio analyzer to the AF OUT (power supply/AF OUT connector) of D-sub 15 pin connector via the MIC amp.
ANT IN A side adjustment
(2) Connect the signal genarator to the ANT IN A connector, and set the signal generator as follows:
Signal generator setting
FREQUENCY (Carrier frequency) :
CE21 model; 482.000 MHz
CE33 model; 578.000 MHz
CE62 model; 810.000 MHz
CE67 model; 850.000 MHz
U14 model; 482.125 MHz
U30 model; 578.125 MHz
U62 model; 770.125 MHz
U66 model; 794.125 MHz

RF OUTPUT (Output level): 60 dBμV_{EMF}
(= −53 dBm)
MODULATION : ±1 kHz
DEVIATION : ±5 kHz

(3) Read the AF OUT level (Indicaton level of the Audio analyzer) . This level is specified to be 0 dB.
(4) Set the MODULATION of the signal generator to the OFF (No modulation) .
(5) Check that the indication level of the audio analyzer is −61 dB or less (S/N: 61 dB or more with A-weighted filter) as compared with level of procedure (3) above.
(6) Change the RF OUTPUT (output level) of the signal generator as shown below.
RF OUTPUT : 10 dBμV$_{EMF}$ (= −103 dBm)
(7) Check that indication level of the Audio analyzer (level meter mode) is −38 dB or less (S/N: 38 dB or more with A-weighted filter) as compared with level of procedure (3) above.
(8) Change the RF OUTPUT and MODULATION of the signal generator as shown below.
MODULATION : ON (modulation frequency=1 kHz).
RF OUTPUT : 60 dBμV$_{EMF}$ (= −53 dBm)
(9) Set the audio analyzer to the distortion meter mode.
(10) Check that the distortion ratio is −40 dB or less (1 % or less with A-weighted filter).

ANT IN B side check
(11) Connect the signal generator to the ANT IN B connector.
(12) Perform the procedures (3) through (10) above for ANT IN B side.

Note

When checking the S/N at 10 dBμV input, note the ANT IN (A or B) connector which shows the better S/N. Use the ANT IN (A or B) connector which shows the better S/N for adjustment under "8. Noise Squelch Adjustment".

8. Noise Squelch Adjustment

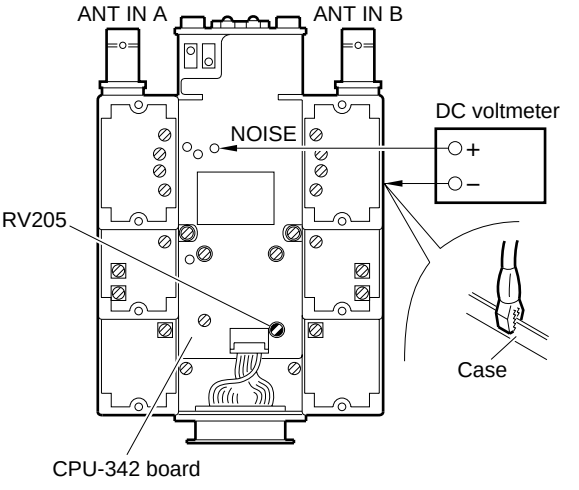
Equipment and Tools

- DC power supply: +7.0 ± 0.1 Vdc
- Signal generator
- DC voltmeter (digital multi meter)
- Audio analyzer
- Adjuster (0.4×1.3 mm) : 1 (Part No. 7-221-652-81)
- Power supply/AF OUT connector
(Refer to the "How to make power supply/AF OUT connector" on page 3-1.)

Connection

Same as "5. FM Detector Adjustment".

Adjustment Location



Switch and Control Setting

Channel setting:
CE21 model; Group 00, 22-32 channel (482.000 MHz)
CE33 model; Group 00, 34-32 channel (578.000 MHz)
CE62 model; Group 00, 63-32 channel (810.000 MHz)
CE67 model; Group 00, 68-32 channel (850.000 MHz)
U14 model; Group 00, 16-01 channel (482.125 MHz)
U30 model; Group 00, 32-01 channel (578.125 MHz)
U62 model; Group 00, 64-01 channel (770.125 MHz)
U66 model; Group 00, 68-01 channel (794.125 MHz)

MUTING: OFF

Procedure

(1) Connect the signal generator to the ANT IN (A or B) connector which showed the better S/N at the input of 10 dBμV_{EMF} (= −103 dBm) under "7. S/N Check". Set the signal generator as follows:
Signal generator setting
FREQUENCY (Carrier frequency) :
CE21 model; 482.000 MHz
CE33 model; 578.000 MHz
CE62 model; 810.000 MHz
CE67 model; 850.000 MHz
U14 model; 482.125 MHz
U30 model; 578.125 MHz
U62 model; 770.125 MHz
U66 model; 794.125 MHz

RF OUTPUT (Output level): 5 dBμV_{EMF} (= −108 dBm)
MODULATION (Modulation frequency) : 1 kHz
DEVIATION (Frequency deviation) : ±5 kHz

(2) Check that the 1 kHz waveform can be distinguished from the waveforms monitered on the oscilloscope.
(3) Turn ⊘RV205/TUN-8 board fully counterclockwise.
(4) Adjustment
Specificaton : DC voltage of NOISE terminal (land)/CPU-342 board changes from "H" (about 4.8 Vdc) to "L" (about 0 V) level.
Adjustment : ⊘RV205/TUN-8 board
Turn ⊘RV205 slowly clockwise for adjustment.

9. Tone Squelch Check

Equipment and Tools

- DC power supply: +7.0 ±0.1 Vdc
- Signal generator
- Function generator
- DC voltmeter
- Power supply/AF OUT connector
  (Refer to the "How to make power supply/AF OUT connector" on page 3-1.)

Connection

Same as "5. FM Detector Adjustment".

Switch and Control Setting

Channel setting:
CE21 model; Group 00, 22-32 channel (482.000 MHz)
CE33 model; Group 00, 34-32 channel (578.000 MHz)
CE62 model; Group 00, 63-32 channel (810.000 MHz)
CE67 model; Group 00, 68-32 channel (850.000 MHz)
U14 model; Group 00, 16-01 channel (482.125 MHz)
U30 model; Group 00, 32-01 channel (578.125 MHz)
U62 model; Group 00, 64-01 channel (770.125 MHz)
U66 model; Group 00, 68-01 channel (794.125 MHz)

MUTING: OFF

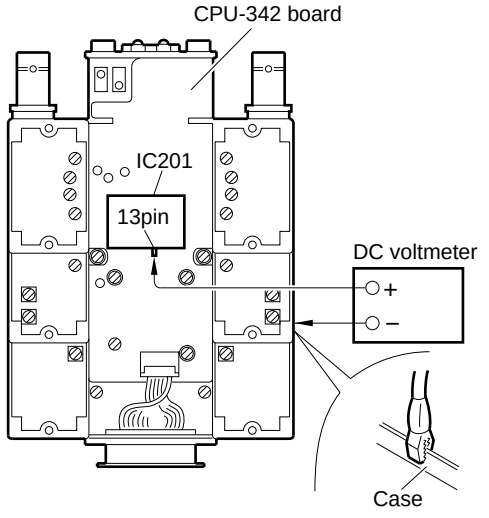
Procedure

Step1: Adjustment
(1) Connect the signal generator to the ANT IN A connector, and set the signal generator as follows:
Signal generator setting
FREQUENCY (Carrier frequency) :
CE21 model; 482.000 MHz
CE33 model; 578.000 MHz
CE62 model; 810.000 MHz
CE67 model; 850.000 MHz
U14 model; 482.125 MHz
U30 model; 578.125 MHz
U62 model; 770.125 MHz
U66 model; 794.125 MHz

RF OUTPUT (Output level): 60 dBμV_{EMF} (= −53 dBm)
MODULATION (Modulation frequency): 32.768 kHz
(32.768 kHz must be set by connecting Function generator.)
DEVIATION (Frequency deviation): ±1.4 kHz

(2) Turn on and off the MODULATION (modulation frequency) of the signal generator as follows, and check that the voltage at the IC201-13 pin (TONE) of the CPU-342 board changes also as follows:

MODULATION of signal genarator	IC201-13 pin/ CPU-342 board voltage
ON	0 V
OFF	About 4.8 V



(3) Connect the signal generator to the ANT IN B connector, and perform the procedures (1) and (2) above.

Step2: Works after completing adjustment
After completing adjustment ("3-2-1. TUN-8 Board Adjustment"), turn off the main power of the WRR-855B and perform the following work then proceed to "3-2-2. Overall Characteristics Check" .
① Attach the T case lid (A) of the unit assembly.
② Attach the front panel and case.

3-2-2. Overall Characteristic Confirmation

Check the overall characteristics by following the procedure below.
When checking the system, the system must be repackaged in the normal operating condition (the case and front panel are attached) and the check must be performed by following procedure below.

Note

When checking the overall characteristics after completing "3-2-1. TUN-8 Board Adjustment" , perform the "Step2 Works after completing adjustment" on page 3-13.

Procedure

1. Current Consumption Check
   ↓
2. S/N Check
   ↓
3. Frequency Characteristic Check
   ↓
4. Distortion Ratio Check
   ↓
5. RF Level Indicator Check
   ↓
6. AF Level Indicator Check

Equipment and Tools

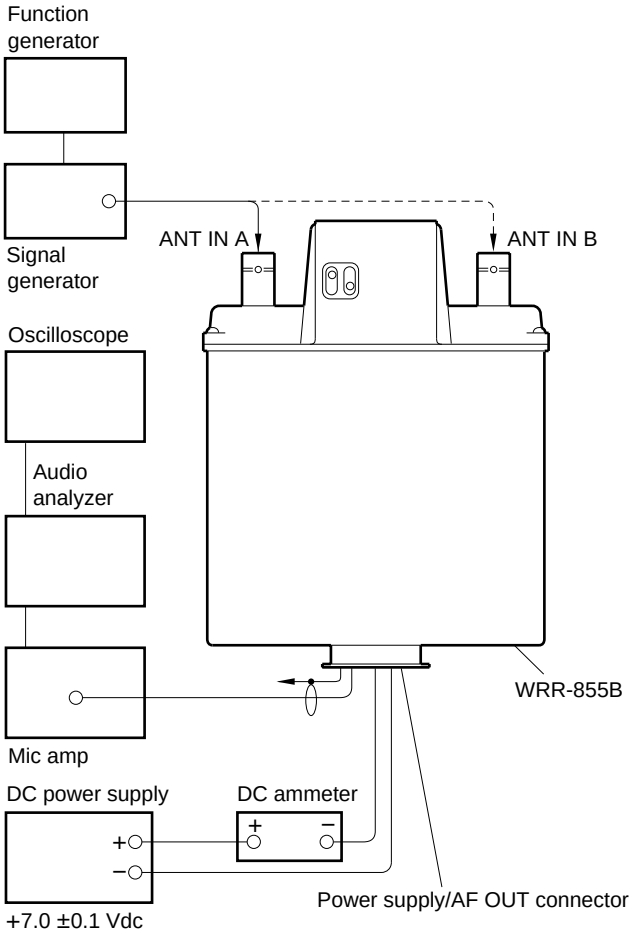
- DC power supply: +7.0 ±0.1 Vdc
- Signal generator
- Audio analyzer
- MIC amp (Noise meter) with A-weighted filter
- Oscilloscope
- DC ammeter
- Power supply/AF OUT connector
  (Refer to the "How to make power supply/AF OUT connector" on page 3-1.)

Switch and Control Setting

Channel setting:
CE21 model; Group 00, 22-32 channel (482.000 MHz)
CE33 model; Group 00, 34-32 channel (578.000 MHz)
CE62 model; Group 00, 63-32 channel (810.000 MHz)
CE67 model; Group 00, 68-32 channel (850.000 MHz)
U14 model; Group 00, 16-01 channel (482.125 MHz)
U30 model; Group 00, 32-01 channel (578.125 MHz)
U62 model; Group 00, 64-01 channel (770.125 MHz)
U66 model; Group 00, 68-01 channel (794.125 MHz)

MUTING: OFF

Connection



1. Current Consumption Check

(1) Set the signal generator as follows:
Signal generator setting
FREQUENCY (Carrier frequency) :
CE21 model; 482.000 MHz
CE33 model; 578.000 MHz
CE62 model; 810.000 MHz
CE67 model; 850.000 MHz
U14 model; 482.125 MHz
U30 model; 578.125 MHz
U62 model; 770.125 MHz
U66 model; 794.125 MHz

RF OUTPUT (Output level): 60 dBμV_{EMF}
(= −53 dBm)
MODULATION (Modulation frequency): 1 kHz
DEVIATION (Frequency deviation) : ±5 kHz

(2) Check that the current consumption (DC current meter indication) is less than 190 mA.

2. S/N Check

Step1: Switch and control setting
Channel setting:
CE21 model; Group 00, 22-32 channel (482.000 MHz)
CE33 model; Group 00, 34-32 channel (578.000 MHz)
CE62 model; Group 00, 63-32 channel (810.000 MHz)
CE67 model; Group 00, 68-32 channel (850.000 MHz)
U14 model; Group 00, 16-01 channel (482.125 MHz)
U30 model; Group 00, 32-01 channel (578.125 MHz)
U62 model; Group 00, 64-01 channel (770.125 MHz)
U66 model; Group 00, 68-01 channel (794.125 MHz)

MUTING: OFF

Step2: Set the signal generator as follows:
Signal generator setting
FREQUENCY (Carrier frequency) :
CE21 model; 482.000 MHz
CE33 model; 578.000 MHz
CE62 model; 810.000 MHz
CE67 model; 850.000 MHz
U14 model; 482.125 MHz
U30 model; 578.125 MHz
U62 model; 770.125 MHz
U66 model; 794.125 MHz

RF OUTPUT (Output level): 60 dBμV_{EMF}
(= −53 dBm)
MODULATION (Modulation frequency): 1 kHz
DEVIATION (Frequency deviation): ±5 kHz

Step3: Checking
(1) Connect the audio analyzer to the AF OUT (power supply/AF OUTPUT connector) of the D-sub 15 pin connector via MIC amp.
(2) Connect the signal generator to the ANT IN A connector.
(3) Read the output level of the AF OUT (Audio analyzer indication level). This level is specified to be 0 dB.
(4) Turn OFF the MODULATION (modulation frequency) of the signal generator. (No modulation)
(5) Check that the output level of the AF OUT is −61 dB or less (S/N is 61 dB or more with A-weighted filter) as compared with the level of procedure (3) above.
(6) Change the RF OUTPUT (output level) of the signal generator as shown below.
RF OUTPUT: 10 dBμV_{EMF} (= −103 dBm)
(7) Check that the output level of the AF OUT is −38 dB or less (S/N is 38 dB or more with A-weighted filter) as compared with the level of procedure (3) above.

(8) Change the RF OUTPUT (output level) of the signal generator as shown below. (Same as setting of Step1)
RF OUTPUT: 60 dBμ (= −53 dBm)
(9) Set the audio analyzer to the distortion meter mode.
(10) Check that the distortion ratio is −40 dB or less (1 % or less).
(11) Connect the signal generator to the ANT IN B connector.
(12) Perform the procedures (3) through (10) above.
(13) Set the channel and FREQUENCY (carrier frequency) of the signal generator as shown ① and ② below. Perform the procedures (1) through (12) for each channel setting.

- CE21 model
  ① Channel setting:
  Group 00, 23-63 channel (493.875 MHz)
  Signal generator setting:
  FREQENCY: 493.875 MHz
  ② Channel setting:
  Group 00, 21-01 channel (470.125 MHz)
  Signal generator setting:
  FREQENCY: 470.125MHz

- CE33 model
  ① Channel setting:
  Group 00, 35-63 channel (589.875 MHz)
  Signal generator setting:
  FREQENCY: 589.875 MHz
  ② Channel setting:
  Group 00, 33-01 channel (566.125 MHz)
  Signal generator setting:
  FREQENCY: 566.125 MHz

- CE62 model
  ① Channel setting:
  Group 00, 64-63 channel (821.875 MHz)
  Signal generator setting:
  FREQENCY: 821.875 MHz
  ② Channel setting:
  Group 00, 62-01 channel (798.125 MHz)
  Signal generator setting:
  FREQENCY: 798.125 MHz

- CE67 model
  ① Channel setting:
  Group 00, 69-64 channel (862.000 MHz)
  Signal generator setting:
  FREQENCY: 862.000 MHz
  ② Channel setting:
  Group 00, 67-01 channel (838.125 MHz)
  Signal generator setting:
  FREQENCY: 838.125 MHz

- U14 model
  ① Channel setting:
  Group 00, 17-47 channel (493.875 MHz)
  Signal generator setting:
  FREQENCY: 493.875 MHz
  ② Channel setting:
  Group 00, 14-01 channel (470.125 MHz)
  Signal generator setting:
  FREQENCY: 470.125 MHz

- U30 model
  ① Channel setting:
  Group 00, 33-47 channel (589.875 MHz)
  Signal generator setting:
  FREQENCY: 589.875 MHz
  ② Channel setting:
  Group 00, 30-01 channel (566.125 MHz)
  Signal generator setting:
  FREQENCY: 566.125 MHz

- U62 model
  ① Channel setting:
  Group 00, 65-47 channel (781.875 MHz)
  Signal generator setting:
  FREQENCY: 781.875 MHz
  ② Channel setting:
  Group 00, 62-01 channel (758.125 MHz)
  Signal generator setting:
  FREQENCY: 758.125 MHz

- U66 model
  ① Channel setting:
  Group 00, 69-47 channel (805.875 MHz)
  Signal generator setting:
  FREQENCY: 805.875 MHz
  ② Channel setting:
  Group 00, 66-01 channel (782.125 MHz)
  Signal generator setting:
  FREQENCY: 782.125 MHz

3. Frequency Characteristic Check

Step1: Switch and control setting

Channel setting:

CE21 model; Group 00, 22-32 channel (482.000 MHz)
CE33 model; Group 00, 34-32 channel (578.000 MHz)
CE62 model; Group 00, 63-32 channel (810.000 MHz)
CE67 model; Group 00, 68-32 channel (850.000 MHz)
U14 model; Group 00, 16-01 channel (482.125 MHz)
U30 model; Group 00, 32-01 channel (578.125 MHz)
U62 model; Group 00, 64-01 channel (770.125 MHz)
U66 model; Group 00, 68-01 channel (794.125 MHz)

MUTING: OFF

Step2: Checking

(1) Connect the audio analyzer (level meter) to the AF OUT (power supply/AF OUT connector) via MIC amp.
(2) Connect the signal generator to the ANT IN A connector, and set it as follows:
Signal generator setting
FREQUENCY (Carrier frequency):
CE21 model; 482.000 MHz
CE33 model; 578.000 MHz
CE62 model; 810.000 MHz
CE67 model; 850.000 MHz
U14 model; 482.125 MHz
U30 model; 578.125 MHz
U62 model; 770.125 MHz
U66 model; 794.125 MHz

RF OUTPUT (Output level): 60 dBμV_{EMF}
(= −53 dBm)
MODULATION (Mmodulation frequency): 1 kHz
DEVIATION (Frequency deviation): ±12 kHz

(3) Read the output level of the AF OUT (indication of the audio analyzer). This level is specified to be 0 dB.
(4) Change the MODULATION (modulation frequency) of the signal generator as follows, and check that the output level with respect to the output level under the procedure (2) is set also as follows.
Note
10 kHz and 15 kHz modulation frequency must be set by using the function generator.

Signal generator MODULATION frequency	AF output level
100 Hz	+1.0 ±1.0 dB
10 kHz	−20.0 ±1.5 dB
15 kHz	−26.5 ±2.5 dB

(5) Connect the signal generator to the ANT IN B connector, and perform the procedures (2), (3) and (4).

4. Distortion Ratio Check

Step 1: Switch and control setting

Channel setting:

CE21 model; Group 00, 22-32 channel (482.000 MHz)
CE33 model; Group 00, 34-32 channel (578.000 MHz)
CE62 model; Group 00, 63-32 channel (810.000 MHz)
CE67 model; Group 00, 68-32 channel (850.000 MHz)
U14 model; Group 00, 16-01 channel (482.125 MHz)
U30 model; Group 00, 32-01 channel (578.125 MHz)
U62 model; Group 00, 64-01 channel (770.125 MHz)
U66 model; Group 00, 68-01 channel (794.125 MHz)

MUTING: OFF

Step2: Checking

(1) Connect the audio analyzer to the AF OUT (power supply/AF OUT connector) of the D-sub 15 pin connector via the MIC amp.
(2) Set the signal generator as follows:
Signal generator setting
FREQUENCY (Carrier frequency):
CE21 model; 482.000 MHz
CE33 model; 578.000 MHz
CE62 model; 810.000 MHz
CE67 model; 850.000 MHz
U14 model; 482.125 MHz
U30 model; 578.125 MHz
U62 model; 770.125 MHz
U66 model; 794.125 MHz

RF OUTPUT (Output level) : 60 dBμV_{EMF}
(= −53 dBm)
MODULATION (Modulation frequency): 1 kHz
DEVIATION (Frequency deviation): ±40 kHz
(3) Set the audio analyzer to the distortion meter mode, and check that the distortion is less than 0.8 %.
(4) Change the MODULATION (modulation frequency) of the signal as shown below.
MODULATION: 10 kHz
(10 kHz modulation frequency must be set by using the function generator.)
Check that the distortion ratio is less than 3 %.
(5) Connect the signal generator to the ANT IN B connector, and perform the procedures (2) through (4) above.
(6) Set the channel and FREQUENCY (carrier frequency) of the signal generator as shown ① and ② below. Perform the procedures (1) through (7) above, for each channel setting (① and ②).

• CE21 model
① Channel setting:
Group 00, 23-63 channel (493.875 MHz)
Signal generator setting:
FREQENCY: 493.875 MHz
② Channel setting:
Group 00, 21-01 channel (470.125 MHz)
Signal generator setting:
FREQENCY: 470.125MHz

• CE33 model
① Channel setting:
Group 00, 35-63 channel (589.875 MHz)
Signal generator setting:
FREQENCY: 589.875 MHz
② Channel setting:
Group 00, 33-01 channel (566.125 MHz)
Signal generator setting:
FREQENCY: 566.125 MHz

• CE62 model
① Channel setting:
Group 00, 64-63 channel (821.875 MHz)
Signal generator setting:
FREQENCY: 821.875 MHz
② Channel setting:
Group 00, 62-01 channel (798.125 MHz)
Signal generator setting:
FREQENCY: 798.125 MHz

• CE67 model
① Channel setting:
Group 00, 69-64 channel (862.000 MHz)
Signal generator setting:
FREQENCY: 862.000 MHz
② Channel setting:
Group 00, 67-01 channel (838.125 MHz)
Signal generator setting:
FREQENCY: 838.125 MHz

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- U14 model
  ① Channel setting:
  Group 00, 17-47 channel (493.875 MHz)
  Signal generator setting:
  FREQENCY: 493.875 MHz
  ② Channel setting:
  Group 00, 14-01 channel (470.125 MHz)
  Signal generator setting:
  FREQENCY: 470.125 MHz

- U30 model
  ① Channel setting:
  Group 00, 33-47 channel (589.875 MHz)
  Signal generator setting:
  FREQENCY: 589.875 MHz
  ② Channel setting:
  Group 00, 30-01 channel (566.125 MHz)
  Signal generator setting:
  FREQENCY: 566.125 MHz

- U62 model
  ① Channel setting:
  Group 00, 65-47 channel (781.875 MHz)
  Signal generator setting:
  FREQENCY: 781.875 MHz
  ② Channel setting:
  Group 00, 62-01 channel (758.125 MHz)
  Signal generator setting:
  FREQENCY: 758.125 MHz

- U66 model
  ① Channel setting:
  Group 00, 69-47 channel (805.875 MHz)
  Signal generator setting:
  FREQENCY: 805.875 MHz
  ② Channel setting:
  Group 00, 66-01 channel (782.125 MHz)
  Signal generator setting:
  FREQENCY: 782.125 MHz

5. RF Input Level Indicator Check

Step 1: Switch and control setting
Channel setting:
CE21 model; Group 00, 22-32 channel (482.000 MHz)
CE33 model; Group 00, 34-32 channel (578.000 MHz)
CE62 model; Group 00, 63-32 channel (810.000 MHz)
CE67 model; Group 00, 68-32 channel (850.000 MHz)
U14 model; Group 00, 16-01 channel (482.125 MHz)
U30 model; Group 00, 32-01 channel (578.125 MHz)
U62 model; Group 00, 64-01 channel (770.125 MHz)
U66 model; Group 00, 68-01 channel (794.125 MHz)

MUTING: OFF

Step2: Checking
(1) Connect the signal generator to the ANT IN A connector, and setthe signal generator as follows:
Signal generator setting
FREQUENCY (Carrier frequency) :
CE21 model; 482.000 MHz
CE33 model; 578.000 MHz
CE62 model; 810.000 MHz
CE67 model; 850.000 MHz
U14 model; 482.125 MHz
U30 model; 578.125 MHz
U62 model; 770.125 MHz
U66 model; 794.125 MHz

RF OUTPUT (Output level): 0 dBμV_{EMF}
(= −113 dBm)
MODULATION (Modulation frequency) : 1 kHz
DEVIATION (Frequency deviation) : ±5 kHz

(2) Increase gradually the output level from the signal generator, and check that the output level of the signal generator is as follows when the RF input level indicator lights.

RF input level indicator	Output level of Signal indicator
Light in red.	10 dBμV_{EMF} ±3 dB
Light in green.	25 dBμV_{EMF} ±3 dB

(3) Connect the signal generator to the ANT IN B connector, and perform the checking of procedure (2) above.
(4) Set the channel setting and FREQUENCY (carrier frequency) of the signal generator as shown ① and ② below. Perform the procedures (1) through (3) above, for each channel setting (① and ②).

- CE21 model
  ① Channel setting:
  Group 00, 23-63 channel (493.875 MHz)
  Signal generator setting:
  FREQENCY: 493.875 MHz
  ② Channel setting:
  Group 00, 21-01 channel (470.125 MHz)
  Signal generator setting:
  FREQENCY: 470.125MHz

- CE33 model
  ① Channel setting:
  Group 00, 35-63 channel (589.875 MHz)
  Signal generator setting:
  FREQENCY: 589.875 MHz
  ② Channel setting:
  Group 00, 33-01 channel (566.125 MHz)
  Signal generator setting:
  FREQENCY: 566.125 MHz

- CE62 model
  ① Channel setting:
  Group 00, 64-63 channel (821.875 MHz)
  Signal generator setting:
  FREQENCY: 821.875 MHz
  ② Channel setting:
  Group 00, 62-01 channel (798.125 MHz)
  Signal generator setting:
  FREQENCY: 798.125 MHz

- CE67 model
  ① Channel setting:
  Group 00, 69-64 channel (862.000 MHz)
  Signal generator setting:
  FREQENCY: 862.000 MHz
  ② Channel setting:
  Group 00, 67-01 channel (838.125 MHz)
  Signal generator setting:
  FREQENCY: 838.125 MHz

- U14 model
  ① Channel setting:
  Group 00, 17-47 channel (493.875 MHz)
  Signal generator setting:
  FREQENCY: 493.875 MHz
  ② Channel setting:
  Group 00, 14-01 channel (470.125 MHz)
  Signal generator setting:
  FREQENCY: 470.125 MHz

- U30 model
  ① Channel setting:
  Group 00, 33-47 channel (589.875 MHz)
  Signal generator setting:
  FREQENCY: 589.875 MHz
  ② Channel setting:
  Group 00, 30-01 channel (566.125 MHz)
  Signal generator setting:
  FREQENCY: 566.125 MHz

- U62 model
  ① Channel setting:
  Group 00, 65-47 channel (781.875 MHz)
  Signal generator setting:
  FREQENCY: 781.875 MHz
  ② Channel setting:
  Group 00, 62-01 channel (758.125 MHz)
  Signal generator setting:
  FREQENCY: 758.125 MHz

- U66 model
  ① Channel setting:
  Group 00, 69-47 channel (805.875 MHz)
  Signal generator setting:
  FREQENCY: 805.875 MHz
  ② Channel setting:
  Group 00, 66-01 channel (782.125 MHz)
  Signal generator setting:
  FREQENCY: 782.125 MHz

6. AF Indicator Check

Step 1: Switch and control setting

Channel setting:

CE21 model; Group 00, 22-32 channel (482.000 MHz)
CE33 model; Group 00, 34-32 channel (578.000 MHz)
CE62 model; Group 00, 63-32 channel (810.000 MHz)
CE67 model; Group 00, 68-32 channel (850.000 MHz)
U14 model; Group 00, 16-01 channel (482.125 MHz)
U30 model; Group 00, 32-01 channel (578.125 MHz)
U62 model; Group 00, 64-01 channel (770.125 MHz)
U66 model; Group 00, 68-01 channel (794.125 MHz)

MUTING: OFF

Step2: Connect the signal generator to the ANT IN A connector, and set the signal generator as follows:

Signal generator setting

FREQUENCY (Carrier frequency):

CE21 model; 482.000 MHz
CE33 model; 578.000 MHz
CE62 model; 810.000 MHz
CE67 model; 850.000 MHz
U14 model; 482.125 MHz
U30 model; 578.125 MHz
U62 model; 770.125 MHz
U66 model; 794.125 MHz

RF OUTPUT (Output level): 60 dBμV_{EMF}
(= −53 dBm)

MODULATION (Modulation frequency): 1 kHz

(2) Increase gradually DEVIATION (frequency deviation) of the sigal generator starting from ±3.0 kHz, and check that the deviation of the signal generator is ±(5.0 ±1.2) kHz with the AF indicator as follows.
AF indicator: Light in green

(3) Connect the signal generator to the ANT IN B connector, perform the procedure (2) above.

Section 4
Spare Parts

4-1. Notes on Repair Parts

1. Safety Related Components Warning

Components marked ⚠ are critical to safe operation. Therefore, specified parts should be used in the case of replacement.

2. Standardization of Parts

Some repair parts supplied by Sony differ from those used for the unit. These are because of parts commonality and improvement.
Parts list has the present standardized repair parts.

3. Stock of Parts

Parts marked with “o” at SP(Supply Code) column of the spare parts list may be not stocked. Therefore, the delivery date will be delayed.

4. Units Representation

The following represented units are changed or omitted in writing.

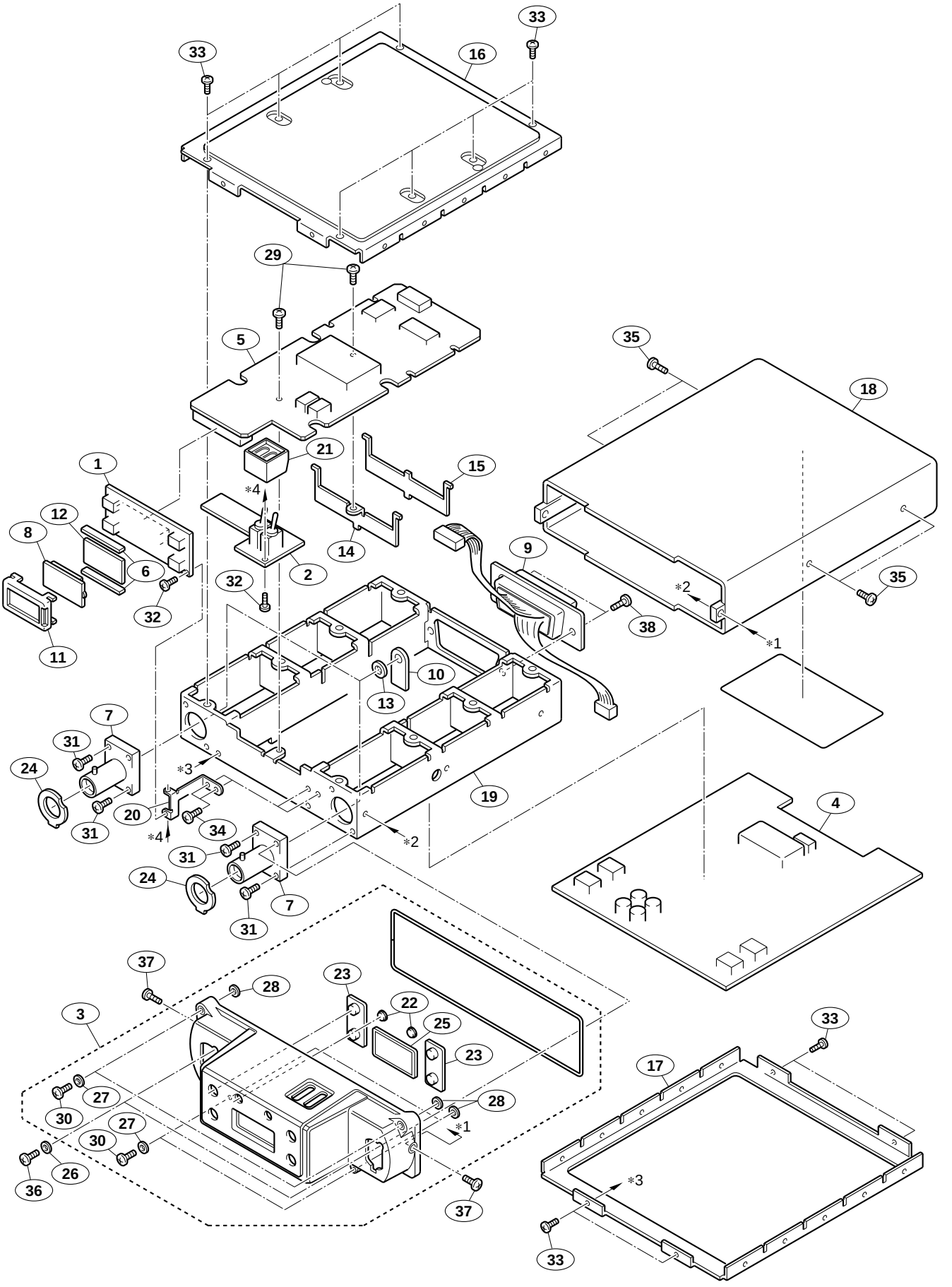
Units		Representation
Capacitance	µF	uF
Inductance	µH	uH
Resistance	Ω	Abbreviation
Temperature	°C	XXX-DEG-C

5. Destination Representation

The part indicated “For U/AU” in the spare parts list is used in the unit written below.
For U : The part is used in a unit for U.S.A.
For AU: The part is used in a unit for Australia.

4-2. Exploded View and Parts List

No.	Part No.	SP	Description
1	A-8272-761-A	o	MOUNTED CIRCUIT BOARD, DP-236
2	A-8272-762-A	o	MOUNTED CIRCUIT BOARD, SW-814
3	A-8272-763-A	o	PANEL ASSY, FRONT
4	A-8328-215-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (CE62) (For CE62 model)
	A-8328-219-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (CE21) (For CE21 model)
	A-8328-224-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (CE33) (For CE33 model)
	A-8328-244-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (CE67) (For CE67 model)
	A-8328-248-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (U14) (For U14 model)
	A-8328-252-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (U30) (For U30 model)
	A-8328-256-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (U62) (For U62 model)
	A-8328-260-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (U66) (For U66 model)
5	A-8328-220-A	o	MOUNTED CIRCUIT BOARD, CPU-342
6	1-537-824-11	s	CONDUCTIVE BOARD, CONNECTION
7	1-750-659-11	s	CONNECTOR, COAXIAL (BNC TYPE)
8	1-810-716-11	s	LCD
9	1-955-597-11	o	HARNESS, SUB (I/F CABLE)
10	2-532-913-00	s	PLATE, CONTACT
11	2-544-406-01	o	CASE, LCD
12	2-544-412-01	o	SPACER, LCD
13	3-555-872-01	s	SPACER
14	3-689-828-01	o	PLATE(A), SHIELD
15	3-689-829-01	o	PLATE(B), SHIELD
16	3-689-830-01	o	LID(A), T-CASE
17	3-689-831-01	o	LID(B), T-CASE
18	3-695-860-01	o	CASE
19	3-695-862-01	o	TUNER CASE
20	3-695-864-02	o	BRACKET, PCB
21	3-695-865-01	o	PACKING, SWITCH
22	3-695-866-01	o	SPACER, LED
23	3-695-867-02	o	SPACER, SWITCH
24	3-695-868-01	o	PACKING, BNC
25	3-695-869-01	o	PLATE, DISPLAY
26	3-701-437-21	s	WASHER
27	3-701-438-11	s	WASHER, 2.5 ϕ
28	3-742-004-01	s	RING, NYLON
29	7-621-255-25	s	SCREW +P 2X4
30	7-621-284-40	s	SCREW +P 2.6X10
31	7-627-452-27	s	SCREW +K 2X4
32	7-627-552-07	s	SCREW,PRECISION +P 1.7X2.5
33	7-627-552-27	s	SCREW,PRECISION +P 1.7X2
34	7-627-553-37	s	SCREW,PRECISION +P 2X3
35	7-627-553-38	s	SCREW,PRECISION +P 2X3
36	7-627-553-58	s	SCREW,PRECISION +P 2X4.5
37	7-627-553-88	s	SCREW,PRECISION +P 2X7
38	7-627-556-37	s	SCREW,PRECISION +P 2.6X4 TYPE 1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4-3. Electrical Parts List

CPU-342 BOARD

Ref. No. or Q'ty	Part No.	SP	Description	
1pc	A-8328-220-A	o	MOUNTED CIRCUIT BOARD, CPU-342	
C701	1-110-528-91	s	CAP,CHIP TANTALUM ELECT 150MF	
C702	1-110-528-91	s	CAP,CHIP TANTALUM ELECT 150MF	
C703	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C704	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C705	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C706	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C707	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C708	1-104-915-11	s	CAP, CHIP TANTALUM ELECT 2.2MF	
C709	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C710	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C711	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C712	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C713	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C714	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C715	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C716	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C717	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C718	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C719	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C720	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C721	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C722	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C723	1-162-923-11	s	CAP, CERAMIC 47PF CH	1608
C724	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C725	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C726	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C727	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C728	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C729	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C730	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C731	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C732	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C733	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C734	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C735	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C736	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C737	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C738	1-110-528-91	s	CAP,CHIP TANTALUM ELECT 150MF	
C741	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C742	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C751	1-162-920-11	s	CAP, CERAMIC 27PF CH	1608
C752	1-162-910-11	s	CAP, CERAMIC 5.0PF CH	1608
C753	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C761	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B	
C762	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B	
C763	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B	
C764	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B	
C765	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B	
C771	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C772	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C773	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C774	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B	1608
C775	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B	
C776	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C777	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C778	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C779	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B	
C780	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B	

(CPU-342 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description	
C781	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C782	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C783	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C784	1-164-230-11	s	CAP,CERAMIC 220PF CH	1608
C785	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C786	1-162-916-11	s	CAP, CERAMIC 12PF CH	1608
C787	1-162-916-11	s	CAP, CERAMIC 12PF CH	1608
C788	1-162-923-11	s	CAP, CERAMIC 47PF CH	1608
C790	1-162-923-11	s	CAP, CERAMIC 47PF CH	1608
C791	1-104-752-11	s	CAP, CHIP TANTALUM ELECT 33MF	
CN701	1-774-178-11	o	CONNECTOR, BOARD TO BOARD 20P	
CN702	1-691-943-21	o	CONNECTOR, BOARD TO BOARD 30P	
CN761	1-565-154-11	o	PIN, CONNECTOR (ANGLE) 7P	
CN762	1-774-796-11	o	PIN, SIL CONNECTOR(PC BOARD)7P	
CT751	1-141-322-11	s	CAP, CHIP TYPE TRIMMER 20PF	
D701	8-719-421-67	s	DIODE MA132WK-TX	
D702	8-719-820-41	s	DIODE 1SS302-TE85L	
D703	8-719-820-41	s	DIODE 1SS302-TE85L	
D731	8-719-421-69	s	DIODE MA133-TX	
D741	8-719-421-69	s	DIODE MA133-TX	
D742	8-719-421-69	s	DIODE MA133-TX	
D771	8-719-044-80	s	DIODE 1SS295(TE85R)	
IC701	8-752-927-01	o	IC CXP83416-055Q	
IC702	8-759-465-76	s	IC AK93C85AM-E2	
IC703	8-759-988-82	s	IC MB3773PF-G-BND-ER	
IC704	8-759-058-60	s	IC TC7SU04FU(TE85R)	
IC751	8-759-209-15	s	IC TC4SU69F(TE85R)	
IC752	8-759-209-15	s	IC TC4SU69F(TE85R)	
IC761	8-759-163-11	s	IC MAX242FWN	
IC771	8-759-209-15	s	IC TC4SU69F(TE85R)	
IC772	8-759-209-15	s	IC TC4SU69F(TE85R)	
IC773	8-759-710-82	s	IC NJM2406F-TE2	
IC774	8-759-082-61	s	IC TC4W53FU(TE12R)	
IC775	8-759-195-81	s	IC TC7S86FU(TE85R)	
IC776	8-759-058-60	s	IC TC7SU04FU(TE85R)	
IC777	8-759-058-62	s	IC TC7S08FU(TE85R)	
IC778	8-759-209-15	s	IC TC4SU69F(TE85R)	
IC779	8-759-209-15	s	IC TC4SU69F(TE85R)	
IC780	8-759-195-81	s	IC TC7S86FU(TE85R)	
IC781	8-759-058-60	s	IC TC7SU04FU(TE85R)	
L701	1-414-194-11	s	INDUCTOR, CHIP	
L771	1-414-194-11	s	INDUCTOR, CHIP	
Q751	8-729-429-18	s	TRANSISTOR RN1104-TE85L	
R701	1-216-833-11	s	RES, CHIP 10K	(1608)
R702	1-216-825-11	s	RES, CHIP 2.2K	(1608)
R703	1-218-715-11	s	RES, METAL FILM CHIP 9.1K	
R704	1-218-715-11	s	RES, METAL FILM CHIP 9.1K	
R705	1-216-836-11	s	RES, CHIP 18K	(1608)
R706	1-216-844-11	s	RES, CHIP 82K	(1608)
R707	1-216-841-11	s	RES, CHIP 47K	(1608)
R708	1-216-844-11	s	RES, CHIP 82K	(1608)
R709	1-216-841-11	s	RES, CHIP 47K	(1608)
R710	1-216-841-11	s	RES, CHIP 47K	(1608)
R711	1-216-833-11	s	RES, CHIP 10K	(1608)
R712	1-216-833-11	s	RES, CHIP 10K	(1608)
R713	1-216-833-11	s	RES, CHIP 10K	(1608)
R714	1-216-833-11	s	RES, CHIP 10K	(1608)
R715	1-216-833-11	s	RES, CHIP 10K	(1608)

(CPU-342 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description	
R716	1-216-833-11	s	RES, CHIP 10K	(1608)
R717	1-216-833-11	s	RES, CHIP 10K	(1608)
R718	1-216-833-11	s	RES, CHIP 10K	(1608)
R719	1-216-841-11	s	RES, CHIP 47K	(1608)
R720	1-216-841-11	s	RES, CHIP 47K	(1608)
R721	1-216-841-11	s	RES, CHIP 47K	(1608)
R722	1-216-797-11	s	RES, CHIP 10	(1608)
R723	1-216-841-11	s	RES, CHIP 47K	(1608)
R724	1-216-841-11	s	RES, CHIP 47K	(1608)
R731	1-216-797-11	s	RES, CHIP 10	(1608)
R741	1-216-833-11	s	RES, CHIP 10K	(1608)
R742	1-216-849-11	s	RES, CHIP 220K	(1608)
R743	1-216-841-11	s	RES, CHIP 47K	(1608)
R744	1-216-833-11	s	RES, CHIP 10K	(1608)
R745	1-216-849-11	s	RES, CHIP 220K	(1608)
R746	1-216-841-11	s	RES, CHIP 47K	(1608)
R751	1-216-857-11	s	RES, CHIP 1.0M	(1608)
R752	1-216-819-11	s	RES, CHIP 680	(1608)
R761	1-216-797-11	s	RES, CHIP 10	(1608)
R771	1-216-827-11	s	RES, CHIP 3.3K	(1608)
R772	1-216-839-11	s	RES, CHIP 33K	(1608)
R773	1-216-835-11	s	RES, CHIP 15K	(1608)
R774	1-216-833-11	s	RES, CHIP 10K	(1608)
R775	1-216-851-11	s	RES, CHIP 330K	(1608)
R776	1-216-797-11	s	RES, CHIP 10	(1608)
R777	1-216-818-11	s	RES, CHIP 560	(1608)
R778	1-216-837-11	s	RES, CHIP 22K	(1608)
R779	1-216-797-11	s	RES, CHIP 10	(1608)
R780	1-216-797-11	s	RES, CHIP 10	(1608)
R781	1-216-797-11	s	RES, CHIP 10	(1608)
R782	1-216-797-11	s	RES, CHIP 10	(1608)
S701	1-572-473-11	s	SWITCH, TACTIL	
X751	1-760-514-11	s	VIBRATOR, CRYSTAL (SMD)	

DP-236 BOARD

Ref. No. or Q'ty	Part No.	SP	Description	
1pc	A-8328-406-A	s	MOUNTED CIRCUIT BOARD (B), DP-236	
C801	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C802	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C803	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C804	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
CN801	1-691-942-11	s	CONNECTOR, BOARD TO BOARD 30P	
D801	8-719-905-20	s	DIODE SLP520D	
D802	8-719-900-24	s	DIODE SLP-124B	
Q801	8-729-427-74	s	TRANSISTOR XP4601-TXE	
R801	1-216-821-11	s	RES, CHIP 1.0K	(1608)
R802	1-216-842-11	s	RES, CHIP 56K	(1608)
R803	1-216-819-11	s	RES, CHIP 680	(1608)
R804	1-216-842-11	s	RES, CHIP 56K	(1608)
R805	1-216-842-11	s	RES, CHIP 56K	(1608)
R806	1-216-823-11	s	RES, CHIP 1.5K	(1608)
R807	1-216-821-11	s	RES, CHIP 1.0K	(1608)
R808	1-216-821-11	s	RES, CHIP 1.0K	(1608)
R809	1-216-821-11	s	RES, CHIP 1.0K	(1608)
R810	1-216-821-11	s	RES, CHIP 1.0K	(1608)
S801	1-692-459-11	s	SWITCH	
S802	1-692-459-11	s	SWITCH	
S803	1-692-459-11	s	SWITCH	
S804	1-692-459-11	s	SWITCH	

SW-814 BOARD

Ref. No. or Q'ty	Part No.	SP	Description	
1pc	A-8328-407-A	s	MOUNTED CIRCUIT BOARD (B), SW-814	
C901	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C902	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C903	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
IC901	8-759-082-61	s	IC TC4W53FU(TE12R)	
Q901	8-729-429-18	s	TRANSISTOR RN1104-TE85L	
R901	1-216-841-11	s	RES, CHIP 47K	(1608)
R902	1-216-841-11	s	RES, CHIP 47K	(1608)
R903	1-216-821-11	s	RES, CHIP 1.0K	(1608)
R904	1-216-841-11	s	RES, CHIP 47K	(1608)
S901	1-570-608-11	s	SWITCH, TOGGLE	
S902	1-570-608-11	s	SWITCH, TOGGLE	

TUN-8 BOARD

Ref. No. or Q'ty	Part No.	SP	Description	
1pc	A-8328-215-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (CE62)	(CE62 model)
1pc	A-8328-219-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (CE21)	(CE21 model)
1pc	A-8328-224-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (CE33)	(CE33 model)
1pc	A-8328-244-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (CE67)	(CE67 model)
1pc	A-8328-248-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (U14)	(U14 model)
1pc	A-8328-252-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (U30)	(U30 model)
1pc	A-8328-256-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (U62)	(U62 model)
1pc	A-8328-260-A	s	MOUNTED CIRCUIT BOARD, TUN-8 (U66)	(U66 model)
C101	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B	1608
C102	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B	1608
C103	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B	1608
C104	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B	1608
C105	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B	1608
C106	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B	1608
C107	1-162-910-11	s	CAP, CERAMIC 5.0PF CH	1608
C108	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C109	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C110	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C111	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C112	1-162-926-11	s	CAP, CERAMIC 82PF CH	1608
C113	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C114	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C115	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C116	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C117	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C118	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C119	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C120	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C121	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C122	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C123	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C124	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C125	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C126	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C127	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C128	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C129	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C130	1-162-920-11	s	CAP, CERAMIC 27PF CH	1608
C131	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C132	1-104-851-11	s	CAP, CHIP TANTALUM ELECT 10MF	
C133	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C134	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C135	1-104-851-11	s	CAP, CHIP TANTALUM ELECT 10MF	
C144	1-104-851-11	s	CAP, CHIP TANTALUM ELECT 10MF	
C145	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C146	1-162-970-11	s	CAP, CERAMIC 10000PF B	1608
C147	1-104-851-11	s	CAP, CHIP TANTALUM ELECT 10MF	
C148	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B	1608
C149	1-164-227-11	s	CAP,CERAMIC 22000PF B	1608
C201	1-104-851-11	s	CAP, CHIP TANTALUM ELECT 10MF	
C202	1-135-201-11	s	CAP,CHIP TANTALUM ELECT 10MF	
C203	1-162-916-11	s	CAP, CERAMIC 12PF CH	1608
C204	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B	

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(TUN-8 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
C205	1-104-851-11	s	CAP, CHIP TANTALUM ELECT 10MF
C206	1-104-851-11	s	CAP, CHIP TANTALUM ELECT 10MF
C207	1-135-201-11	s	CAP,CHIP TANTALUM ELECT 10MF
C208	1-162-916-11	s	CAP, CERAMIC 12PF CH 1608
C209	1-104-851-11	s	CAP, CHIP TANTALUM ELECT 10MF
C212	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C213	1-135-201-11	s	CAP,CHIP TANTALUM ELECT 10MF
C214	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C215	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C216	1-104-851-11	s	CAP, CHIP TANTALUM ELECT 10MF
C217	1-135-201-11	s	CAP,CHIP TANTALUM ELECT 10MF
C218	1-104-553-11	s	CAP, CHIP FILM 0.015MF (3216)
C219	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C220	1-104-539-11	s	CAP, CHIP FILM 0.001MF (2125)
C221	1-104-544-11	s	CAP, CHIP FILM 0.0027MF (2125)
C222	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C224	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C225	1-104-559-11	s	CAP, CHIP FILM 0.047MF (3216)
C226	1-135-201-11	s	CAP,CHIP TANTALUM ELECT 10MF
C228	1-135-076-21	s	CAP,CHIP TANTALUM ELECT 1.0MF
C229	1-135-076-21	s	CAP,CHIP TANTALUM ELECT 1.0MF
C230	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C231	1-126-412-11	s	CAP, CHIP ELECT 220MF
C234	1-104-559-11	s	CAP, CHIP FILM 0.047MF (3216)
C235	1-135-201-11	s	CAP,CHIP TANTALUM ELECT 10MF
C236	1-162-919-11	s	CAP, CERAMIC 22PF CH 1608
C237	1-104-851-11	s	CAP, CHIP TANTALUM ELECT 10MF
C239	1-162-919-11	s	CAP, CERAMIC 22PF CH 1608
C240	1-135-201-11	s	CAP,CHIP TANTALUM ELECT 10MF
C241	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C242	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C243	1-135-177-21	s	CAP,CHIP TANTALUM ELECT 1.0MF
C244	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C245	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C246	1-163-275-11	s	CAP, CERAMIC 1000PF CH (2012)
C247	1-163-275-11	s	CAP, CERAMIC 1000PF CH (2012)
C248	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C249	1-135-177-21	s	CAP,CHIP TANTALUM ELECT 1.0MF
C250	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C251	1-135-201-11	s	CAP,CHIP TANTALUM ELECT 10MF
C252	1-162-928-11	s	CAP, CERAMIC 120PF CH 1608
C253	1-135-211-11	s	CAP,CHIP TANTALUM ELECT 6.8MF
C254	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C255	1-135-201-11	s	CAP,CHIP TANTALUM ELECT 10MF
C256	1-162-915-11	s	CAP, CERAMIC 10PF CH 1608
C257	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C258	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C259	1-135-177-21	s	CAP,CHIP TANTALUM ELECT 1.0MF
C260	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C261	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C262	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C263	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C264	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C265	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C266	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C267	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C268	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C269	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C270	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C301	1-162-916-11	s	CAP, CERAMIC 12PF CH 1608

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Ref. No. or Q'ty	Part No.	SP	Description
C302	1-104-914-11	s	CAP,CHIP TANTALUM ELECT 22MF
C303	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C304	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C305	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C306	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C307	1-135-211-11	s	CAP,CHIP TANTALUM ELECT 6.8MF
C308	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C309	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C310	1-135-166-21	s	CAP,CHIP TANTALUM ELECT 47MF
C311	1-135-166-21	s	CAP,CHIP TANTALUM ELECT 47MF
C312	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C313	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C314	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C315	1-162-905-11	s	CAP, CERAMIC 1.0PF CK 1608
C316	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C317	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C318	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C319	1-162-905-11	s	CAP, CERAMIC 1.0PF CK 1608
C320	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C321	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C322	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C323	1-162-908-11	s	CAP, CERAMIC 3.0PF CJ 1608
C324	1-162-908-11	s	CAP, CERAMIC 3.0PF CJ 1608
C325	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C326	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C327	1-162-916-11	s	CAP, CERAMIC 12PF CH 1608
C328	1-162-916-11	s	CAP, CERAMIC 12PF CH 1608
C329	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C330	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C331	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C401	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C402	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C403	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C404	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C405	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C406	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C407	1-162-910-11	s	CAP, CERAMIC 5.0PF CH 1608
C408	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C409	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C410	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C411	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C412	1-162-926-11	s	CAP, CERAMIC 82PF CH 1608
C413	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C414	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C415	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C416	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C417	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C418	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C419	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C420	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C421	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C422	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C423	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C424	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C425	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C426	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C427	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C428	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C429	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C430	1-162-920-11	s	CAP, CERAMIC 27PF CH 1608

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Ref. No. or Q'ty	Part No.	SP	Description
C431	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C432	1-104-851-11	s	CAP, CHIP TANTALUM ELECT 10MF
C433	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C434	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C435	1-104-851-11	s	CAP, CHIP TANTALUM ELECT 10MF
C444	1-104-851-11	s	CAP, CHIP TANTALUM ELECT 10MF
C445	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C446	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C447	1-104-851-11	s	CAP, CHIP TANTALUM ELECT 10MF
C448	1-162-964-11	s	CAP,CHIP CERAMIC 1000PF B 1608
C449	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C651	1-110-398-11	s	CAP, CHIP TANTALUM ELECT 15MF
C652	1-127-561-11	s	CAP, ELECT (SOLID) 33MF
C653	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C654	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C655	1-127-561-11	s	CAP, ELECT (SOLID) 33MF
C656	1-164-227-11	s	CAP,CERAMIC 22000PF B 1608
C657	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C658	1-107-826-11	s	CAP, CHIP CERAMIC 100000PF B
C659	1-128-393-11	s	CAP, ELECT 100MF
C660	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C661	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C662	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
C663	1-162-970-11	s	CAP, CERAMIC 10000PF B 1608
CF101	1-760-027-11	s	FILTER, CERAMIC
CF102	1-760-027-11	s	FILTER, CERAMIC
CF103	1-760-027-11	s	FILTER, CERAMIC
CF104	1-760-027-11	s	FILTER, CERAMIC
CF401	1-760-027-11	s	FILTER, CERAMIC
CF402	1-760-027-11	s	FILTER, CERAMIC
CF403	1-760-027-11	s	FILTER, CERAMIC
CF404	1-760-027-11	s	FILTER, CERAMIC
CN102	1-750-932-11	o	CONNECTOR, COAXIAL(RECEPTACLE)
CN402	1-750-932-11	o	CONNECTOR, COAXIAL(RECEPTACLE)
CN601	1-568-359-11	s	CONNECTOR, BOARD TO BOARD 20P
CN602	1-565-137-11	o	PIN, CONNECTOR (STRAIGHT) 4P
CP301	1-795-193-21	s	OSCILLATOR (VCO) (CE21/U14 model)
	1-795-197-21	s	OSCILLATOR (VCO) (CE33/U30 model)
	1-795-205-21	s	OSCILLATOR (VCO) (U62 model)
	1-795-206-21	s	OSCILLATOR (VCO) (U66 model)
	1-795-207-21	s	OSCILLATOR (VCO) (CE62 model)
	1-795-209-21	s	OSCILLATOR (VCO) (CE67 model)
CP302	1-760-815-11	s	OSCILLATOR, CRYSTAL
CT101	1-141-325-11	s	CAP, CHIP TYPE TRIMMER 5PF (CE62/CE67/U66 model)
	1-141-313-11	s	CAP, CHIP TYPE TRIMMER 10PF (CE21/CE33/U14/U30/U62 model)
CT102	1-141-325-11	s	CAP, CHIP TYPE TRIMMER 5PF (CE62/CE67/U62/U66 model)
	1-141-313-11	s	CAP, CHIP TYPE TRIMMER 10PF (CE21/CE33/U14/U30 model)
CT103	1-141-325-11	s	CAP, CHIP TYPE TRIMMER 5PF (CE62/CE67/U62/U66 model)
	1-141-313-11	s	CAP, CHIP TYPE TRIMMER 10PF (CE21/CE33/U14/U30 model)
CT104	1-141-325-11	s	CAP, CHIP TYPE TRIMMER 5PF (CE62/CE67/U66 model)
	1-141-313-11	s	CAP, CHIP TYPE TRIMMER 10PF (CE21/CE33/U14/U30/U62 model)
CT105	1-141-313-11	s	CAP, CHIP TYPE TRIMMER 10PF

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Ref. No. or Q'ty	Part No.	SP	Description
CT106	1-141-313-11	s	CAP, CHIP TYPE TRIMMER 10PF
CT302	1-141-435-21	s	CAP, CHIP TYPE TRIMMER 3PF
CT303	1-141-435-21	s	CAP, CHIP TYPE TRIMMER 3PF
CT401	1-141-325-11	s	CAP, CHIP TYPE TRIMMER 5PF (CE62/CE67/U66 model)
	1-141-313-11	s	CAP, CHIP TYPE TRIMMER 10PF (CE21/CE33/U14/U30/U62 model)
CT402	1-141-325-11	s	CAP, CHIP TYPE TRIMMER 5PF (CE62/CE67/U62/U66 model)
	1-141-313-11	s	CAP, CHIP TYPE TRIMMER 10PF (CE21/CE33/U14/U30 model)
CT403	1-141-325-11	s	CAP, CHIP TYPE TRIMMER 5PF (CE62/CE67/U62/U66 model)
	1-141-313-11	s	CAP, CHIP TYPE TRIMMER 10PF (CE21/CE33/U14/U30 model)
CT404	1-141-325-11	s	CAP, CHIP TYPE TRIMMER 5PF (CE62/CE67/U66 model)
	1-141-313-11	s	CAP, CHIP TYPE TRIMMER 10PF (CE21/CE33/U14/U30/U62 model)
CT405	1-141-313-11	s	CAP, CHIP TYPE TRIMMER 10PF
CT406	1-141-313-11	s	CAP, CHIP TYPE TRIMMER 10PF
D201	8-719-421-67	s	DIODE MA132WK-TX
D202	8-719-421-67	s	DIODE MA132WK-TX
D203	8-719-421-67	s	DIODE MA132WK-TX
D204	8-719-421-67	s	DIODE MA132WK-TX
FL101	1-234-616-21	s	FILTER, BAND PASS (CE21/U14 model)
	1-234-620-21	s	FILTER, BAND PASS (CE33/U30 model)
	1-234-628-21	s	FILTER, BAND PASS (U62 model)
	1-234-629-21	s	FILTER, BAND PASS (U66 model)
	1-234-630-21	s	FILTER, BAND PASS (CE62 model)
	1-234-632-21	s	FILTER, BAND PASS (CE67 model)
FL102	1-234-616-21	s	FILTER, BAND PASS (CE21/U14 model)
	1-234-620-21	s	FILTER, BAND PASS (CE33/U30 model)
	1-234-628-21	s	FILTER, BAND PASS (U62 model)
	1-234-629-21	s	FILTER, BAND PASS (U66 model)
	1-234-630-21	s	FILTER, BAND PASS (CE62 model)
	1-234-632-21	s	FILTER, BAND PASS (CE67 model)
FL401	1-234-616-21	s	FILTER, BAND PASS (CE21/U14 model)
	1-234-620-21	s	FILTER, BAND PASS (CE33/U30 model)
	1-234-628-21	s	FILTER, BAND PASS (U62 model)
	1-234-629-21	s	FILTER, BAND PASS (U66 model)
	1-234-630-21	s	FILTER, BAND PASS (CE62 model)
	1-234-632-21	s	FILTER, BAND PASS (CE67 model)
FL402	1-234-616-21	s	FILTER, BAND PASS (CE21/U14 model)
	1-234-620-21	s	FILTER, BAND PASS (CE33/U30 model)
	1-234-628-21	s	FILTER, BAND PASS (U62 model)
	1-234-629-21	s	FILTER, BAND PASS (U66 model)
	1-234-630-21	s	FILTER, BAND PASS (CE62 model)
	1-234-632-21	s	FILTER, BAND PASS (CE67 model)
IC101	8-759-355-20	s	IC TA31161FN(EL)
IC102	8-759-230-39	s	IC TA8122AF(J.TP1)
IC201	8-759-198-34	s	IC TA75S558F(TE85R)
IC202	8-759-198-34	s	IC TA75S558F(TE85R)
IC203	8-759-523-02	s	IC TC74HC4053AFT(EL)
IC204	8-759-198-34	s	IC TA75S558F(TE85R)
IC205	8-759-198-34	s	IC TA75S558F(TE85R)
IC206	8-759-539-60	s	IC SA575DK-T
IC207	8-759-198-34	s	IC TA75S558F(TE85R)
IC208	8-759-198-34	s	IC TA75S558F(TE85R)
IC209	8-759-330-32	s	IC TC75S51F-TE85L
IC210	8-759-075-66	s	IC TA75S01F(TE85L)
IC211	8-759-198-34	s	IC TA75S558F(TE85R)

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Ref. No. or Q'ty	Part No.	SP	Description
IC212	8-759-075-66	s	IC TA75S01F(TE85L)
IC213	8-759-075-66	s	IC TA75S01F(TE85L)
IC214	8-759-330-32	s	IC TC75S51F-TE85L
IC215	8-759-075-66	s	IC TA75S01F(TE85L)
IC301	8-759-512-18	s	IC MB1512PFV-G-BND
IC302	8-759-075-70	s	IC TA75S393F-TE85R
IC401	8-759-355-20	s	IC TA31161FN(EL)
IC402	8-759-230-39	s	IC TA8122AF(J.TP1)
IC651	8-759-095-59	s	IC M5237ML-TP1
IC652	8-759-512-51	s	IC RH5RE50AA-T1
L101	1-414-463-41	s	INDUCTOR, CHIP (J) 10NH (CE62/CE67/U62/U66 model)
	1-414-465-31	s	INDUCTOR, CHIP (J) 15NH (CE33/U30 model)
	1-414-467-31	s	INDUCTOR, CHIP (J) 22NH (CE21/U14 model)
L102	1-414-463-41	s	INDUCTOR, CHIP (J) 10NH (CE62/CE67/U62/U66 model)
	1-414-465-31	s	INDUCTOR, CHIP (J) 15NH (CE33/U30 model)
	1-414-467-31	s	INDUCTOR, CHIP (J) 22NH (CE21/U14 model)
L103	1-414-461-31	s	INDUCTOR, CHIP (K) 6.8NH (CE62/CE67/U62/U66 model)
	1-414-463-41	s	INDUCTOR, CHIP (J) 10NH (CE33/U30 model)
	1-414-465-31	s	INDUCTOR, CHIP (J) 15NH (CE21/U14 model)
L104	1-414-459-11	s	INDUCTOR, CHIP (S) 4.7NH (CE62/CE67/U62/U66 model)
	1-414-463-41	s	INDUCTOR, CHIP (J) 10NH (CE33/U30 model)
	1-414-465-31	s	INDUCTOR, CHIP (J) 15NH (CE21/U14 model)
L105	1-410-733-11	s	CHIP INDUCTOR 0.22UH
L106	1-410-735-21	s	CHIP INDUCTOR 0.33UH
L107	1-410-733-11	s	CHIP INDUCTOR 0.22UH
L108	1-410-381-11	s	CHIP INDUCTOR 10UH
L109	1-410-381-11	s	CHIP INDUCTOR 10UH
L110	1-410-381-11	s	CHIP INDUCTOR 10UH
L302	1-414-461-31	s	INDUCTOR, CHIP (K) 6.8NH
L303	1-414-238-21	s	INDUCTOR, CHIP 4.7NH (CE62/CE67/U62/U66 model)
	1-414-239-21	s	INDUCTOR, CHIP 6.8NH (CE21/CE33/U14/U30 model)
L304	1-414-238-21	s	INDUCTOR, CHIP 4.7NH (CE62/CE67/U62/U66 model)
	1-414-239-21	s	INDUCTOR, CHIP 6.8NH (CE21/CE33/U14/U30 model)
L305	1-410-733-11	s	CHIP INDUCTOR 0.22UH
L306	1-410-731-31	s	CHIP INDUCTOR 0.15UH
L307	1-410-731-31	s	CHIP INDUCTOR 0.15UH
L308	1-410-730-11	s	CHIP INDUCTOR 0.12UH
L309	1-410-730-11	s	CHIP INDUCTOR 0.12UH
L401	1-414-463-41	s	INDUCTOR, CHIP (J) 10NH (CE62/CE67/U62/U66 model)
	1-414-465-31	s	INDUCTOR, CHIP (J) 15NH (CE33/U30 model)
	1-414-467-31	s	INDUCTOR, CHIP (J) 22NH (CE21/U14 model)
L402	1-414-463-41	s	INDUCTOR, CHIP (J) 10NH (CE62/CE67/U62/U66 model)
	1-414-465-31	s	INDUCTOR, CHIP (J) 15NH (CE33/U30 model)
	1-414-467-31	s	INDUCTOR, CHIP (J) 22NH (CE21/U14 model)

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Ref. No. or Q'ty	Part No.	SP	Description
L403	1-414-461-31	s	INDUCTOR, CHIP (K) 6.8NH (CE62/CE67/U62/U66 model)
	1-414-463-41	s	INDUCTOR, CHIP (J) 10NH (CE33/U30 model)
	1-414-465-31	s	INDUCTOR, CHIP (J) 15NH (CE21/U14 model)
L404	1-414-459-11	s	INDUCTOR, CHIP (S) 4.7NH (CE62/CE67/U62/U66 model)
	1-414-463-41	s	INDUCTOR, CHIP (J) 10NH (CE33/U30 model)
	1-414-465-31	s	INDUCTOR, CHIP (J) 15NH (CE21/U14 model)
L405	1-410-733-11	s	CHIP INDUCTOR 0.22UH
L406	1-410-735-21	s	CHIP INDUCTOR 0.33UH
L407	1-410-733-11	s	CHIP INDUCTOR 0.22UH
L408	1-410-381-11	s	CHIP INDUCTOR 10UH
L409	1-410-381-11	s	CHIP INDUCTOR 10UH
L410	1-410-381-11	s	CHIP INDUCTOR 10UH
L651	1-424-274-21	s	COIL, CHOKE 50UH
Q101	8-729-143-32	s	TRANSISTOR 3SK177-T1-U72
Q102	8-729-020-57	s	TRANSISTOR 3SK245-T2-U55
Q103	8-729-020-57	s	TRANSISTOR 3SK245-T2-U55
Q104	8-729-020-57	s	TRANSISTOR 3SK245-T2-U55
Q105	8-729-020-57	s	TRANSISTOR 3SK245-T2-U55
Q106	8-729-402-19	s	TRANSISTOR XN6501-TW
Q107	8-729-402-19	s	TRANSISTOR XN6501-TW
Q301	8-729-230-81	s	TRANSISTOR 2SC3606-TE85L
Q302	8-729-230-81	s	TRANSISTOR 2SC3606-TE85L
Q303	8-729-425-64	s	TRANSISTOR 2SC4738-YGR-TE85L
Q304	8-729-101-11	s	TRANSISTOR 2SC2351-T1R2
Q305	8-729-101-11	s	TRANSISTOR 2SC2351-T1R2
Q401	8-729-143-32	s	TRANSISTOR 3SK177-T1-U72
Q402	8-729-020-57	s	TRANSISTOR 3SK245-T2-U55
Q403	8-729-020-57	s	TRANSISTOR 3SK245-T2-U55
Q404	8-729-020-57	s	TRANSISTOR 3SK245-T2-U55
Q405	8-729-020-57	s	TRANSISTOR 3SK245-T2-U55
Q406	8-729-402-19	s	TRANSISTOR XN6501-TW
Q407	8-729-402-19	s	TRANSISTOR XN6501-TW
Q651	8-729-120-53	s	TRANSISTOR 2SJ132-Z-T2
Q652	8-729-425-64	s	TRANSISTOR 2SC4738-YGR-TE85L
Q653	8-729-820-86	s	TRANSISTOR 2SB1121-T-TD
R101	1-216-843-11	s	RES, CHIP 68K (1608)
R102	1-216-835-11	s	RES, CHIP 15K (1608)
R103	1-216-839-11	s	RES, CHIP 33K (1608)
R104	1-216-797-11	s	RES, CHIP 10 (1608)
R105	1-216-812-11	s	RES, CHIP 180 (1608)
R106	1-216-797-11	s	RES, CHIP 10 (1608)
R107	1-216-844-11	s	RES, CHIP 82K (1608)
R108	1-216-834-11	s	RES, CHIP 12K (1608)
R109	1-216-839-11	s	RES, CHIP 33K (1608)
R110	1-216-844-11	s	RES, CHIP 82K (1608)
R111	1-216-833-11	s	RES, CHIP 10K (1608)
R112	1-216-839-11	s	RES, CHIP 33K (1608)
R113	1-216-797-11	s	RES, CHIP 10 (1608)
R114	1-216-797-11	s	RES, CHIP 10 (1608)
R115	1-216-844-11	s	RES, CHIP 82K (1608)
R116	1-216-829-11	s	RES, CHIP 4.7K (1608)
R117	1-216-839-11	s	RES, CHIP 33K (1608)
R118	1-216-844-11	s	RES, CHIP 82K (1608)
R119	1-216-828-11	s	RES, CHIP 3.9K (1608)
R120	1-216-839-11	s	RES, CHIP 33K (1608)

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Ref. No. or Q'ty	Part No.	SP	Description	
R121	1-216-797-11	s	RES, CHIP 10	(1608)
R122	1-216-797-11	s	RES, CHIP 10	(1608)
R123	1-216-836-11	s	RES, CHIP 18K	(1608)
R124	1-216-831-11	s	RES, CHIP 6.8K	(1608)
R125	1-216-822-11	s	RES, CHIP 1.2K	(1608)
R126	1-216-821-11	s	RES, CHIP 1.0K	(1608)
R127	1-216-797-11	s	RES, CHIP 10	(1608)
R128	1-216-814-11	s	RES, CHIP 270	(1608)
R129	1-216-825-11	s	RES, CHIP 2.2K	(1608)
R130	1-216-836-11	s	RES, CHIP 18K	(1608)
R131	1-216-831-11	s	RES, CHIP 6.8K	(1608)
R132	1-216-822-11	s	RES, CHIP 1.2K	(1608)
R133	1-216-821-11	s	RES, CHIP 1.0K	(1608)
R134	1-216-798-11	s	RES, CHIP 12	(1608)
R135	1-216-825-11	s	RES, CHIP 2.2K	(1608)
R136	1-216-814-11	s	RES, CHIP 270	(1608)
R140	1-216-834-11	s	RES, CHIP 12K	(1608)
R201	1-216-842-11	s	RES, CHIP 56K	(1608)
R202	1-216-841-11	s	RES, CHIP 47K	(1608)
R203	1-216-845-11	s	RES, CHIP 100K	(1608)
R204	1-216-826-11	s	RES, CHIP 2.7K	(1608)
R205	1-216-832-11	s	RES, CHIP 8.2K	(1608)
R206	1-218-692-11	s	RES, METAL FILM CHIP 1.0K	
R207	1-216-842-11	s	RES, CHIP 56K	(1608)
R208	1-216-841-11	s	RES, CHIP 47K	(1608)
R209	1-216-845-11	s	RES, CHIP 100K	(1608)
R210	1-216-826-11	s	RES, CHIP 2.7K	(1608)
R211	1-216-832-11	s	RES, CHIP 8.2K	(1608)
R212	1-218-692-11	s	RES, METAL FILM CHIP 1.0K	
R213	1-216-845-11	s	RES, CHIP 100K	(1608)
R214	1-216-845-11	s	RES, CHIP 100K	(1608)
R215	1-216-845-11	s	RES, CHIP 100K	(1608)
R216	1-216-842-11	s	RES, CHIP 56K	(1608)
R217	1-216-841-11	s	RES, CHIP 47K	(1608)
R218	1-216-845-11	s	RES, CHIP 100K	(1608)
R219	1-216-823-11	s	RES, CHIP 1.5K	(1608)
R220	1-216-835-11	s	RES, CHIP 15K	(1608)
R221	1-216-845-11	s	RES, CHIP 100K	(1608)
R222	1-216-845-11	s	RES, CHIP 100K	(1608)
R223	1-216-837-11	s	RES, CHIP 22K	(1608)
R224	1-216-837-11	s	RES, CHIP 22K	(1608)
R225	1-218-702-11	s	RES, METAL FILM CHIP 2.7K	
R226	1-216-842-11	s	RES, CHIP 56K	(1608)
R227	1-216-841-11	s	RES, CHIP 47K	(1608)
R228	1-218-704-11	s	RES, METAL FILM CHIP 3.3K	
R229	1-218-708-11	s	RES, METAL FILM CHIP 4.7K	
R230	1-218-708-11	s	RES, METAL FILM CHIP 4.7K	
R231	1-218-694-11	s	RES, METAL FILM CHIP 1.2K	
R232	1-218-710-11	s	RES, METAL FILM CHIP 5.6K	
R233	1-216-831-11	s	RES, CHIP 6.8K	(1608)
R234	1-218-710-11	s	RES, METAL FILM CHIP 5.6K	
R235	1-218-694-11	s	RES, METAL FILM CHIP 1.2K	
R236	1-216-834-11	s	RES, CHIP 12K	(1608)
R237	1-216-835-11	s	RES, CHIP 15K	(1608)
R247	1-216-842-11	s	RES, CHIP 56K	(1608)
R248	1-216-841-11	s	RES, CHIP 47K	(1608)
R249	1-216-845-11	s	RES, CHIP 100K	(1608)
R250	1-216-821-11	s	RES, CHIP 1.0K	(1608)
R251	1-216-841-11	s	RES, CHIP 47K	(1608)
R252	1-216-845-11	s	RES, CHIP 100K	(1608)

(TUN-8 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description	
R253	1-216-825-11	s	RES, CHIP 2.2K	(1608)
R254	1-216-854-11	s	RES, CHIP 560K	(1608)
R255	1-216-833-11	s	RES, CHIP 10K	(1608)
R256	1-216-843-11	s	RES, CHIP 68K	(1608)
R257	1-216-831-11	s	RES, CHIP 6.8K	(1608)
R258	1-216-854-11	s	RES, CHIP 560K	(1608)
R259	1-216-833-11	s	RES, CHIP 10K	(1608)
R260	1-218-704-11	s	RES, METAL FILM CHIP 3.3K	
R261	1-218-708-11	s	RES, METAL FILM CHIP 4.7K	
R262	1-216-833-11	s	RES, CHIP 10K	(1608)
R263	1-216-833-11	s	RES, CHIP 10K	(1608)
R264	1-216-845-11	s	RES, CHIP 100K	(1608)
R265	1-216-825-11	s	RES, CHIP 2.2K	(1608)
R266	1-216-854-11	s	RES, CHIP 560K	(1608)
R267	1-216-833-11	s	RES, CHIP 10K	(1608)
R268	1-216-842-11	s	RES, CHIP 56K	(1608)
R269	1-216-854-11	s	RES, CHIP 560K	(1608)
R270	1-216-833-11	s	RES, CHIP 10K	(1608)
R271	1-216-823-11	s	RES, CHIP 1.5K	(1608)
R272	1-216-844-11	s	RES, CHIP 82K	(1608)
R273	1-216-845-11	s	RES, CHIP 100K	(1608)
R274	1-216-825-11	s	RES, CHIP 2.2K	(1608)
R275	1-216-854-11	s	RES, CHIP 560K	(1608)
R276	1-216-833-11	s	RES, CHIP 10K	(1608)
R277	1-216-845-11	s	RES, CHIP 100K	(1608)
R278	1-216-821-11	s	RES, CHIP 1.0K	(1608)
R279	1-216-841-11	s	RES, CHIP 47K	(1608)
R280	1-216-845-11	s	RES, CHIP 100K	(1608)
R281	1-216-825-11	s	RES, CHIP 2.2K	(1608)
R282	1-216-854-11	s	RES, CHIP 560K	(1608)
R283	1-216-833-11	s	RES, CHIP 10K	(1608)
R284	1-216-843-11	s	RES, CHIP 68K	(1608)
R285	1-216-829-11	s	RES, CHIP 4.7K	(1608)
R286	1-216-854-11	s	RES, CHIP 560K	(1608)
R287	1-216-833-11	s	RES, CHIP 10K	(1608)
R302	1-216-809-11	s	RES, CHIP 100	(1608)
R303	1-216-805-11	s	RES, CHIP 47	(1608)
R304	1-216-842-11	s	RES, CHIP 56K	(1608)
R305	1-216-839-11	s	RES, CHIP 33K	(1608)
R306	1-216-837-11	s	RES, CHIP 22K	(1608)
R307	1-216-851-11	s	RES, CHIP 330K	(1608)
R308	1-216-833-11	s	RES, CHIP 10K	(1608)
R309	1-216-833-11	s	RES, CHIP 10K	(1608)
R310	1-216-832-11	s	RES, CHIP 8.2K	(1608)
R311	1-216-819-11	s	RES, CHIP 680	(1608)
R312	1-216-809-11	s	RES, CHIP 100	(1608)
R313	1-216-829-11	s	RES, CHIP 4.7K	(1608)
R314	1-216-831-11	s	RES, CHIP 6.8K	(1608)
R315	1-216-829-11	s	RES, CHIP 4.7K	(1608)
R316	1-216-815-11	s	RES, CHIP 330	(1608)
R317	1-216-831-11	s	RES, CHIP 6.8K	(1608)
R318	1-216-829-11	s	RES, CHIP 4.7K	(1608)
R319	1-216-815-11	s	RES, CHIP 330	(1608)
R320	1-216-807-11	s	RES, CHIP 68	(1608)
R321	1-216-807-11	s	RES, CHIP 68	(1608)
R322	1-216-809-11	s	RES, CHIP 100	(1608)
R323	1-216-817-11	s	RES, CHIP 470	(1608)
R324	1-216-817-11	s	RES, CHIP 470	(1608)
R325	1-216-839-11	s	RES, CHIP 33K	(1608)
R326	1-216-839-11	s	RES, CHIP 33K	(1608)

(TUN-8 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description	
R327	1-216-815-11	s	RES, CHIP 330	(1608)
R328	1-216-815-11	s	RES, CHIP 330	(1608)
R329	1-216-815-11	s	RES, CHIP 330	(1608)
R401	1-216-843-11	s	RES, CHIP 68K	(1608)
R402	1-216-835-11	s	RES, CHIP 15K	(1608)
R403	1-216-839-11	s	RES, CHIP 33K	(1608)
R404	1-216-797-11	s	RES, CHIP 10	(1608)
R405	1-216-812-11	s	RES, CHIP 180	(1608)
R406	1-216-797-11	s	RES, CHIP 10	(1608)
R407	1-216-844-11	s	RES, CHIP 82K	(1608)
R408	1-216-834-11	s	RES, CHIP 12K	(1608)
R409	1-216-839-11	s	RES, CHIP 33K	(1608)
R410	1-216-844-11	s	RES, CHIP 82K	(1608)
R411	1-216-833-11	s	RES, CHIP 10K	(1608)
R412	1-216-839-11	s	RES, CHIP 33K	(1608)
R413	1-216-797-11	s	RES, CHIP 10	(1608)
R414	1-216-797-11	s	RES, CHIP 10	(1608)
R415	1-216-844-11	s	RES, CHIP 82K	(1608)
R416	1-216-829-11	s	RES, CHIP 4.7K	(1608)
R417	1-216-839-11	s	RES, CHIP 33K	(1608)
R418	1-216-844-11	s	RES, CHIP 82K	(1608)
R419	1-216-828-11	s	RES, CHIP 3.9K	(1608)
R420	1-216-839-11	s	RES, CHIP 33K	(1608)
R421	1-216-797-11	s	RES, CHIP 10	(1608)
R422	1-216-797-11	s	RES, CHIP 10	(1608)
R423	1-216-836-11	s	RES, CHIP 18K	(1608)
R424	1-216-831-11	s	RES, CHIP 6.8K	(1608)
R425	1-216-822-11	s	RES, CHIP 1.2K	(1608)
R426	1-216-821-11	s	RES, CHIP 1.0K	(1608)
R427	1-216-797-11	s	RES, CHIP 10	(1608)
R428	1-216-814-11	s	RES, CHIP 270	(1608)
R429	1-216-825-11	s	RES, CHIP 2.2K	(1608)
R430	1-216-836-11	s	RES, CHIP 18K	(1608)
R431	1-216-831-11	s	RES, CHIP 6.8K	(1608)
R432	1-216-822-11	s	RES, CHIP 1.2K	(1608)
R433	1-216-821-11	s	RES, CHIP 1.0K	(1608)
R434	1-216-798-11	s	RES, CHIP 12	(1608)
R435	1-216-825-11	s	RES, CHIP 2.2K	(1608)
R436	1-216-814-11	s	RES, CHIP 270	(1608)
R440	1-216-834-11	s	RES, CHIP 12K	(1608)
R651	1-216-845-11	s	RES, CHIP 100K	(1608)
R652	1-216-845-11	s	RES, CHIP 100K	(1608)
R653	1-216-841-11	s	RES, CHIP 47K	(1608)
R654	1-216-845-11	s	RES, CHIP 100K	(1608)
R655	1-216-813-11	s	RES, CHIP 220	(1608)
R656	1-216-817-11	s	RES, CHIP 470	(1608)
R657	1-218-722-11	s	RES, METAL FILM CHIP 18K	
R658	1-218-708-11	s	RES, METAL FILM CHIP 4.7K	
RV201	1-241-832-21	s	RES, ADJ, CERMET 5K	
RV202	1-241-832-21	s	RES, ADJ, CERMET 5K	
RV205	1-241-834-21	s	RES, ADJ, CERMET 20K	
SWF101	1-760-028-11	s	FILTER, SAW	
SWF401	1-760-028-11	s	FILTER, SAW	
T101	1-406-784-21	s	TRANSFORMER, IF	
T102	1-406-782-21	s	TRANSFORMER, IF	
T103	1-411-494-11	s	DETECTOR COIL	
T301	1-406-785-21	s	COIL, BALANCE	
T401	1-406-784-21	s	TRANSFORMER, IF	

(TUN-8 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
T402	1-406-782-21	s	TRANSFORMER, IF
T403	1-411-494-11	s	DETECTOR COIL
X201	1-567-098-41	s	VIBRATOR, CRYSTAL
X203	1-760-252-12	s	VIBRATOR, CRYSTAL

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FRAME
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 Ref. No.
 or Q'ty  Part No.    SP Description

 2pcs     1-501-612-13 o ANTENNA                (WHIP)
```

4-4. Supplied Accessories

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 Ref. No.
 or Q'ty  Part No.    SP Description

 1pc      3-205-119-11 s FREQUENCY LIST        (CE21 model)
 1pc      3-205-123-11 s FREQUENCY LIST        (CE33 model)
 1pc      3-205-133-11 s FREQUENCY LIST        (CE62 model)
 1pc      3-205-135-11 s FREQUENCY LIST        (CE67 model)
 1pc      3-205-136-11 s FREQUENCY LIST         (U14 model)

 1pc      3-205-140-11 s FREQUENCY LIST         (U30 model)
 1pc      3-205-148-11 s FREQUENCY LIST         (U62 model)
 1pc      3-205-149-11 s FREQUENCY LIST         (U66 model)

 11pcs    3-205-446-01 o LABEL, COUNTRY (21)
                                          (CE21/CE33 model)
 11pcs    3-205-474-01 o LABEL, COUNTRY (62)   (CE62 model)
 11pcs    3-205-475-01 o LABEL, COUNTRY (67)   (CE67 model)

 1pc      3-205-489-11 s OPERATING INSTRUCTIONS
```

Section 5
Semiconductor Pin Assignments

The semiconductors in the manual are listed by equivalent types. Thus the external view or the index mark indication may differ from the actual type.
In some cases incompatible types are also listed, therefore, when a part is to be replaced, also refer to the Spare Parts section.
Pin assignments and block diagrams are based on the IC manufacturer's data book.

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TC7S86FU (TE85R)	5-5
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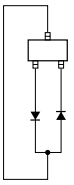
Diode, Transistor

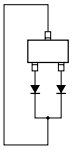
DIODE

(SCALE 4/1)
TOP VIEW

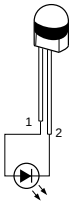


1S295 (TE85R)
1SS302-TE85L
MA133-TX

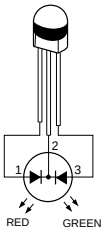
-TOP VIEW-



MA132WK-TX



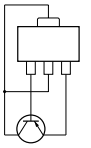
SLP-124B



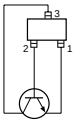
SLP520D

TRANSISTOR

-TOP VIEW-

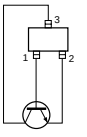


2SB1121-T-TD

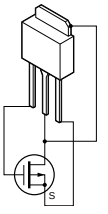


2SC2351-T1R2

(SCALE 4/1)
TOP VIEW

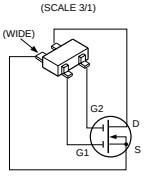


2SC3606-TE85L
2SC4738-YGR-TE85L



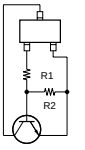
2SJ132-Z-T2

(SCALE 3/1)



3SK177-T1-U72
3SK245-T2-U55

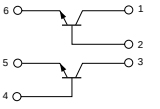
-TOP VIEW-



RN1104-TE85L

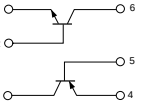
-TOP VIEW-

XN6501-TW



-TOP VIEW-

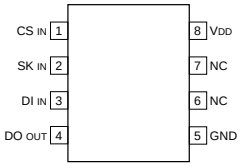
XP4601-TXE

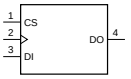


IC

AK93C85AM-E2 (ASAHI)

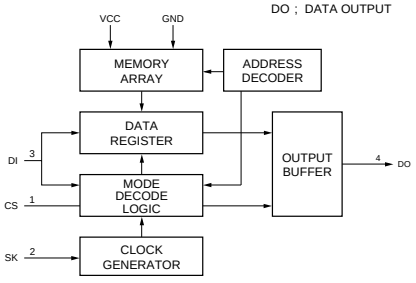
C-MOS 16,384-BIT SERIAL EEPROM
—TOP VIEW—





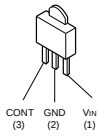
INPUT
CS ; CHIP SELECT
DI ; DATA INPUT
SK ; SERIAL CLOCK

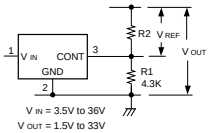
OUTPUT
DO ; DATA OUTPUT



M5237ML-TP1 (MITSUBISHI)

ADJUSTABLE VOLTAGE REGULATOR





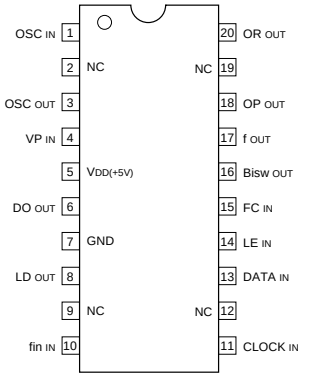
V IN = 3.5V to 36V
V OUT = 1.5V to 33V

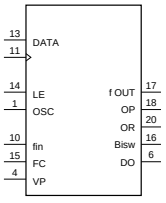
$V_{OUT} = V_{REF}(1+\frac{R2}{R1}) \fallingdotseq 1.26x(1+\frac{R2}{4.3})$ (V)

(R1 = 4.3KΩ, $V_{REF} \fallingdotseq 1.26V$)

MB1512PFV-G-BND (FUJITSU)

C-MOS PLL FREQUENCY SYNTHESIZER
—TOP VIEW—





INPUT

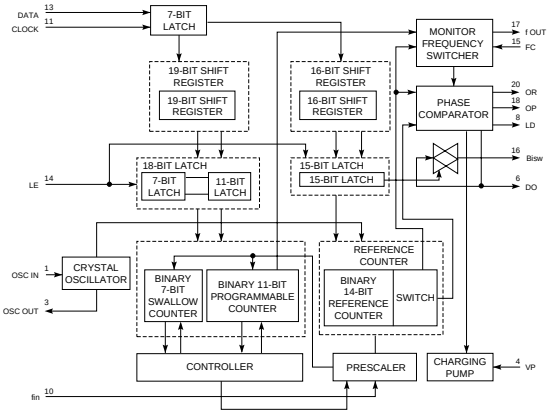
CLOCK	;	CLOCK INPUT FOR 19-BIT SHIFT REGISTER AND 16-BIT SHIFT REGISTER
DATA	;	SERIAL DATA INPUT (BINARY CODE)
FC	;	SWITCHES PHASE OF PHASE COMPARATOR
FIN	;	PRE-SCALER INPUT
LE	;	LOAD ENABLE SIGNAL INPUT
OSCIN	;	CONNECTED TO CRYSTAL OSCILLATOR (REFERENCE FREQUENY DIVIDER INPUT)
VP	;	POWER SOURCE FOR CHARGING PUMP OUTPUT

OUTPUT

BISW	;	ANALOG SWITCH OUTPUT, NORMALLY IN HIGH IMPEDANCE
DO	;	BUILT-IN CHARGING PUMP OUTPUT
FOUT	;	MONITOR FOR PHASE COMPARATOR INPUT

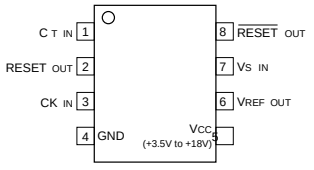
FC	OUTPUT SIGNAL
H	REFERENCE FREQUENCY DIVIDER
L	COMPARISON FREQUENCY DIVDER

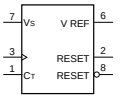
LD	;	PHASE COMPARATOR OUTPUT
OSCOUT	;	CONNECTED TO CRYSTAL OSCILLATOR
Ø P AND Ø R	;	OUTPUT FOR PHASE COMPARATOR EXTERNAL CHARGING PUMP

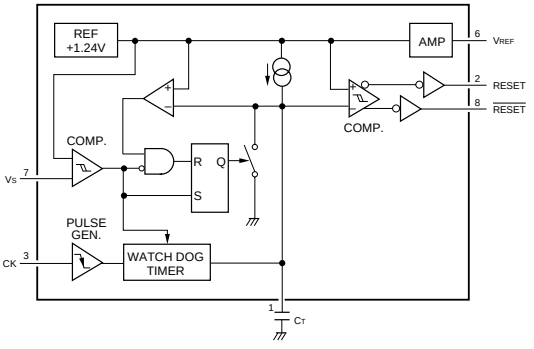


MB3773PF-G-BND-ER (FUJITSU)

BIPOLAR SOURCE VOLTAGE SUPERVISOR
—TOP VIEW—

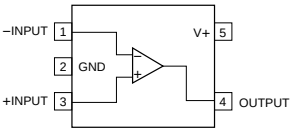






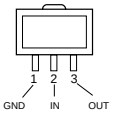
NJM2406F-TE2 (JRC)

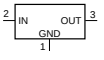
SINGLE COMPARATOR
—TOP VIEW—



RH5RE50AA-T1 (RICOH)

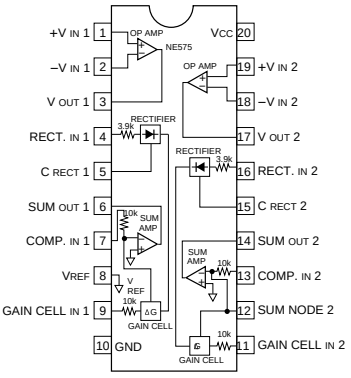
THREE TERMINAL POSITIVE VOLTAGE REGULATOR
—TOP VIEW—





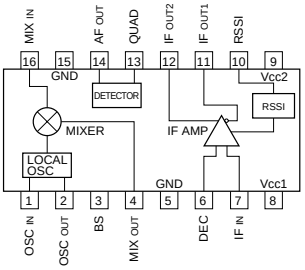
SA575DK-T (PHILIPS)

LOW VOLTAGE COMPANDOR
—TOP VIEW—



TA31161FN (EL) (TOSHIBA)

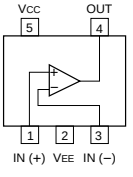
IF DETECTOR
—TOP VIEW—



OSC IN, OUT	; LOCAL OSC INPUT
BS	; BATTERY SAVE
MIXER OUT	; MIXER OUTPUT
DEC	; BIAS FOR IF INPUT
IF IN	; IF INPUT
RSSI	; RSSI OUTPUT
IF OUT1, 2	; IF LIMITTER OUTPUT
QUAD	; PHASE INPUT FOR FM DETECTOR
AF OUT	; DEMODULATION SIGNAL OUTPUT
MIX IN	; MIXER INPUT

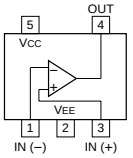
TA75S01F (TE85L) (TOSHIBA)

SINGLE OPERATIONAL AMPLIFIER
—TOP VIEW—



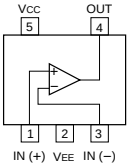
TA75S393F-TE85R (TOSHIBA)

SINGLE COMPARATOR
—TOP VIEW—



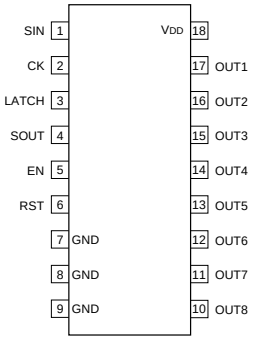
TA75S558F (TE85R) (TOSHIBA)

SINGLE OPERATIONAL AMPLIFIER
—TOP VIEW—

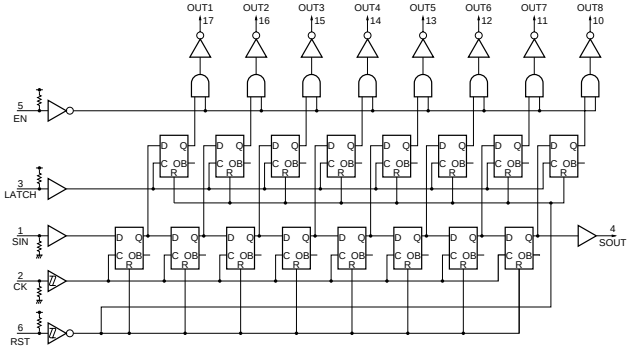


TA8122AF (J.TP1) (TOSHIBA)

CMOS SHIFT RESISTOR WITH LATCH
—TOP VIEW—

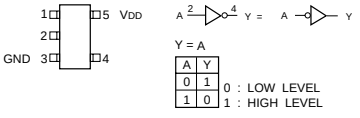


SIN	:	SERIAL DATA INPUT
CK	:	SHIFT CLOCK INPUT
LATCH	:	LATCH INPUT
SOUT	:	SHIFT RESISTOR (FINAL STAGE) OUTPUT
EN	:	ENABLE INPUT
RST	:	RESET INPUT
OUT1 - OUT8	:	SHIFT RESISTOR LATCH OUTPUT1-8



TC4SU69F (TE85R) (TOSHIBA)

C-MOS INVERTER
—TOP VIEW—

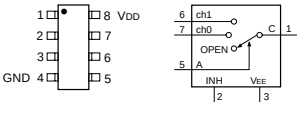


A	Y
0	1
1	0

0 : LOW LEVEL
1 : HIGH LEVEL

TC4W53FU (TE12R) (TOSHIBA)

C-MOS 2-CHANNEL MULTIPLEXER/DEMULTIPLEXER
—TOP VIEW—



CONT. INPUT		ON CHANNEL
INH	A	
0	0	ch0
0	1	ch1
1	×	OPEN

0 : LOW LEVEL
1 : HIGH LEVEL
× : DON'T CARE

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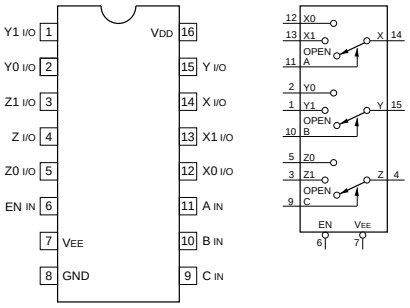
TC74HC4053AFT (EL) (TOSHIBA)

C-MOS TRIPLE 2-CHANNEL ANALOG MULTIPLEXER/DEMULTIPLEXER

—TOP VIEW—



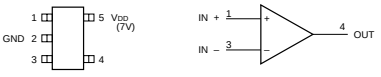
CONTROL INPUTS				ON CHANNEL		
EN	SELECT					
	C	B	A			
0	0	0	0	Z0	Y0	X0
0	0	0	1	Z0	Y0	X1
0	0	1	0	Z0	Y1	X0
0	0	1	1	Z0	Y1	X1
0	1	0	0	Z1	Y0	X0
0	1	0	1	Z1	Y0	X1
0	1	1	0	Z1	Y1	X0
0	1	1	1	Z1	Y1	X1
1	x	x	x	OPEN		

0 : LOW LEVEL
1 : HIGH LEVEL
x : DON'T CARE

TC75S51F-TE85L (TOSHIBA)

C-MOS OPERATIONAL AMPLIFIER

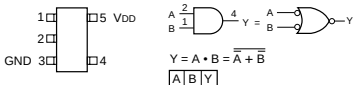
—TOP VIEW—



TC7S08FU (TE85R) (TOSHIBA)

C-MOS 2-INPUT AND GATE

—TOP VIEW—



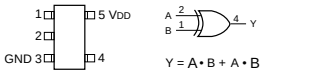
A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

0 : LOW LEVEL
1 : HIGH LEVEL

TC7S86FU (TE85R) (TOSHIBA)

C-MOS 2-INPUT EXCLUSIVE OR GATE

—TOP VIEW—



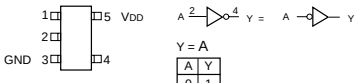
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

0 : LOW LEVEL
1 : HIGH LEVEL

TC7SU04FU(TE85R) (TOSHIBA)

C-MOS INVERTER

—TOP VIEW—

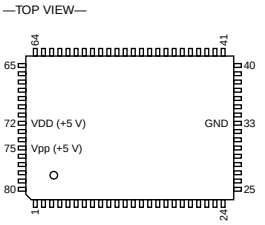


A	Y
0	1
1	0

0 : LOW LEVEL
1 : HIGH LEVEL

Pin description of CPU

CXP834P16Q-1-XXX



[Inputs]

Signal Name	Pin No.	Description
VDD	72	Power supply input (+5 Vdc)
Vpp	75	Power supply input (+5 Vdc) for PROM
Vss	33	GND for power supply
EXTAL	31	Clock input (8 MHz)
XTAL	32	Clock input (8 MHz: Phase-reversal of EXTAL)
VLC3	35	Bias voltage for LCD
VLC2	36	Bias voltage for LCD
VLC1	37	Bias voltage for LCD
ALO	22	Audio signal level (analog)
RSSI(A)	23	RF signal level of ANTENNA A input (analog)
RSSI(B)	24	RF signal level of ANTENNA B input (analog)
TEMP	25	Temperature detection
BAT0	26	Power supply voltage (analog)
BAT2	27	Power supply voltage for tuner circuit (analog)
DIST1	28	Selection 1 for destination (model type) (analog)
DIST2	29	Selection 2 for destination (model type) (analog)
TONE	13	Tone signal detection (L: detecting)
NOISE	14	Noise signal detection (L: detecting)
PLL-LD	16	PLL lock detection (H: Lock)
CH	1	Operation button (CH) (L: ON)
+	18	Operation button (+) (L: ON)
–	19	Operation button (–) (L: ON)
SQL SET	21	RSSI learning mode setting (L: RSSI learning mode when POWER is on)
MUTE	79	MUTING ON/OFF switch (L: ON)
GP	80	Operation button (GP) (L: ON)
RST	30	Reset

[Outputs]

Signal Name	Pin No.	Description
COM0, COM1	38, 39	LCD control
SEG0 to SEG19	42 to 61	LCD control
VL	34	Bias voltage control for LCD
SHDN	3	Control for shut down of IC761 (L: shut down)
WDT	4	Watch dog timer
RFG	11	Control for RF LED (green)
AFR	12	Control for AF LED (red)
RFR	20	Control for RF LED (red)
DIV	66	Diversity control (H: ANT A, L: ANT B)
AFM	67	AF muting (H: Muting OFF)

[Inputs/Outputs for EEPROM and PLL]

Signal Name	Pin No.	Description
ROM-DO	17	EEPROM Control
ROM-CS	68	EEPROM Control
ROM-SK/PLL-CLK	69	EEPROM/PLL control
ROM-DI/PLL-DATA	70	EEPROM/PLL control
PLL-LE	77	PLL control

[Inputs/Outputs for communication]

Signal Name	Pin No.	Description
IF-CS	6	Serial I/O control
IF-CLK	7	Serial I/O control
IF-DI	8	Serial I/O control
IF-DO	9	Serial I/O control

[Others]

Signal Name	Pin No.	Description
PE4/RMC	2	NC
PB0/CS1	5	NC
PC2	15	NC
COM2, COM3	40, 41	NC
SEG20 to SEG23	62 to 65	NC
PF5/SEG29	71	NC
PF6/SEG30	76	NC
TX	73	NC
TEX	74	NC
PE0/INT0/EC	78	NC
PB5/SCK1	10	NC

Section 6
Block Diagrams

General Description

The WRR-855B consists of the following circuit boards:

Board Name	Quantity	Reference No.
TUN-8 board	1	100 to 400 and 600s
CPU-342 board	1	700 series
DP-236 board	1	800 series
SW-814 board	1	900 series

TUN-8 Board

The TUN-8 board is powered by the DC +7 V power supply and functions as the PLL synthesized diversity tuner which is controlled by the CPU-342 board. The TUN-8 board receives the RF signal input from the antenna A and antenna B, and outputs the demodulated audio signal. The TUN-8 board also supplies the RSSI signal and the DC-converted audio signal to the CPU-342 board. The TUN-8 board consists of the power supply block, RF block and the audio block.

The power supply block receives the DC +7 V power input which is supplied from the D-sub connector via CN602. The power supply block supplies DC +6 V (IC651) to the RF block and audio block from the voltage regulator IC651 and IC652. It supplies DC +5 V (IC652) to the 1st local circuit of the RF block.

The RF block consists of RF amplifier circuit, 1st mixer circuit, 2nd mixer circuit, IF circuit, FM detector circuit, 1st local circuit and 2nd local circuit. Two equivalent circuit of the RF amplifier circuit, 1st mixer circuit, 2nd mixer circuit, IF circuit and FM detector circuit are provided for antenna A (Ref. No. 100s) and for antenna B (Ref. No. 400s).

The RF signal which is input from the antenna A and antenna B are passed through band-pass filters (FL101, FL401), amplified by RF amplifiers (Q101, Q401), passed through band-pass filters (FL102 and FL402) and input to 1st mixer circuit. The RF signal is mixed with the 1st local signal in the 1st mixer circuit (Q102, Q103, Q402, Q403) where the input signal is converted to the 1st IF signal (150.75 MHz). The 1st IF signal is mixed with the 2nd local signal at the 2nd mixer circuit (Q104, Q105, Q404, Q405) where the 1st IF signal is converted to the 2nd IF signal (10.7 MHz). The 2nd IF signal is detected by the FM detector IC (IC102, IC402) which outputs audio (AF) signal. The audio signal is sent to the audio block. The 2nd IF signal is converted to the RSSI signal by the IF amplifier (IC101, IC401) and is output to the CPU-342 board. The 1st local signal is generated by controlling the VCO (CP301) with the PLL IC (IC301). The 2nd local signal is generated by the crystal oscillator (CP302).

The audio block consists of the tone signal detector circuit, noise signal detector circuit, diversity switching circuit, muting circuit, de-emphasis circuit, expander circuit and audio amplifier circuit. The FM detector outputs (audio outputs AF (A) and (B)) of the RF block are amplified by the AF amplifier (A) (IC201) and AF amplifier (B) (IC202) and is sent to the diversity switching circuit (IC203-1/3). The diversity switching is controlled by the DIV signal from the CPU-342 board. The audio output signal from the diversity switching circuit is passed through the muting circuit (IC203-2/3), de-emphasis circuit (IC204), low-pass filter circuit (IC205) and expander circuit (IC206) then amplified by the AF amplifier (IC207) and feed the D-sub connector via CN602.

CPU-342 Board

The CPU-342 board consists of the CPU which performs the system control, and the system clock oscillator circuit. The CPU (IC701) controls the TUN-8 board, DP-236 board and SW-814 board.

The clock oscillator circuit (X751, CT751, IC751, IC752, etc.,) oscillates the 4 MHz clock which is fed to the tuner unit. The 4 MHz signal is multiplied (IC780) to generate 8 MHz signal which is supplied to the CPU. 4 MHz clock can be input to the WRR-855B from external source. If external clock is input, clock signal is switched from the internal clock to the external clock automatically by IC772, IC773, IC774, etc.

Connector CN761 is the connector for external interface which relays the serial I/O signals of the CPU (IC701) and external controller. IC761 shifts the level (TTL ↔ RS-232C) of external interface signal of the CPU.

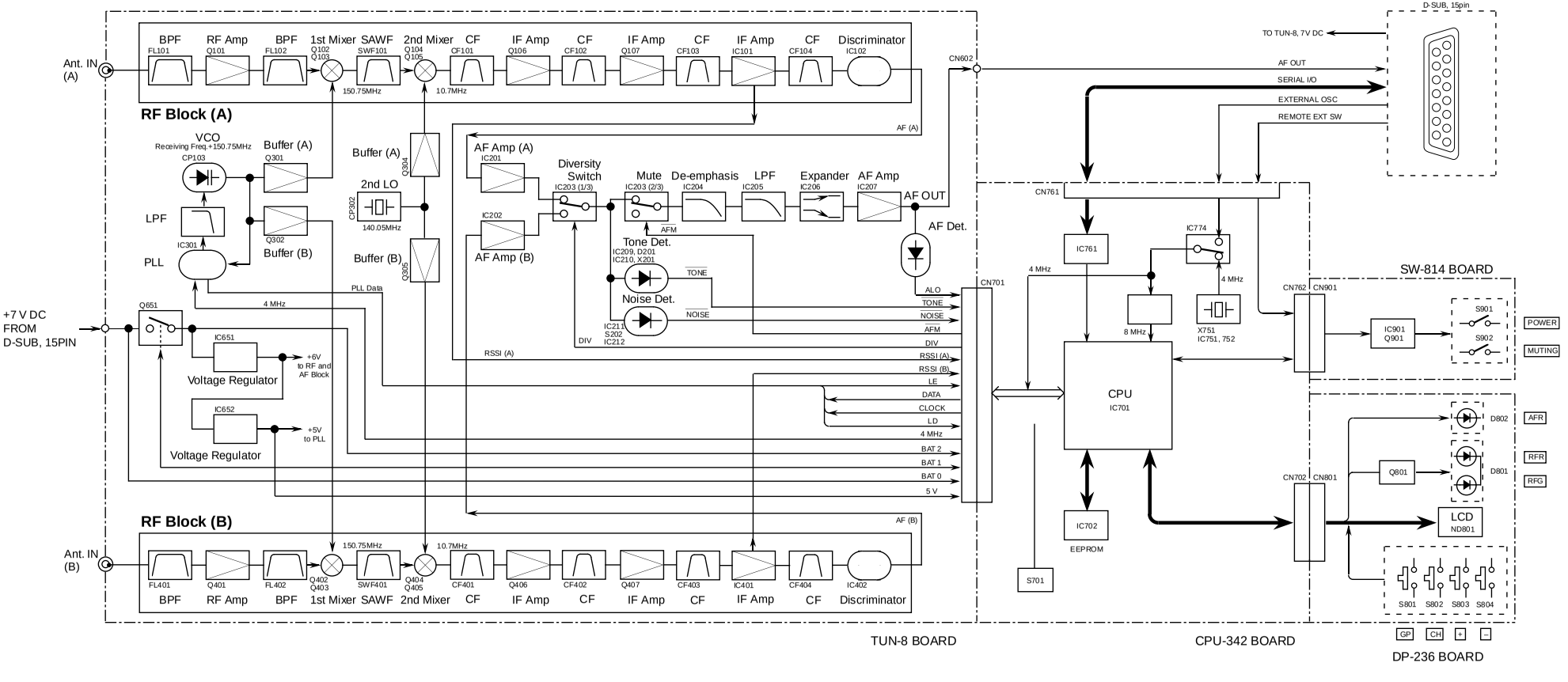
DP-236 Board

The DP-236 board consists of display block and operation control block.

The dipslay block has the LCD (ND801) which indicates the various status of groups and channels, and the RF indicator (D801) and the AF indicator (D802) which indicates status of RF input and audio input. The operation control block consists of the switches (S801 to S804) which perform the various settings such as group setting and channel setting. When these switches are operated, the various settings are performed by the CPU on the CPU-342 board.

SW-814 Board

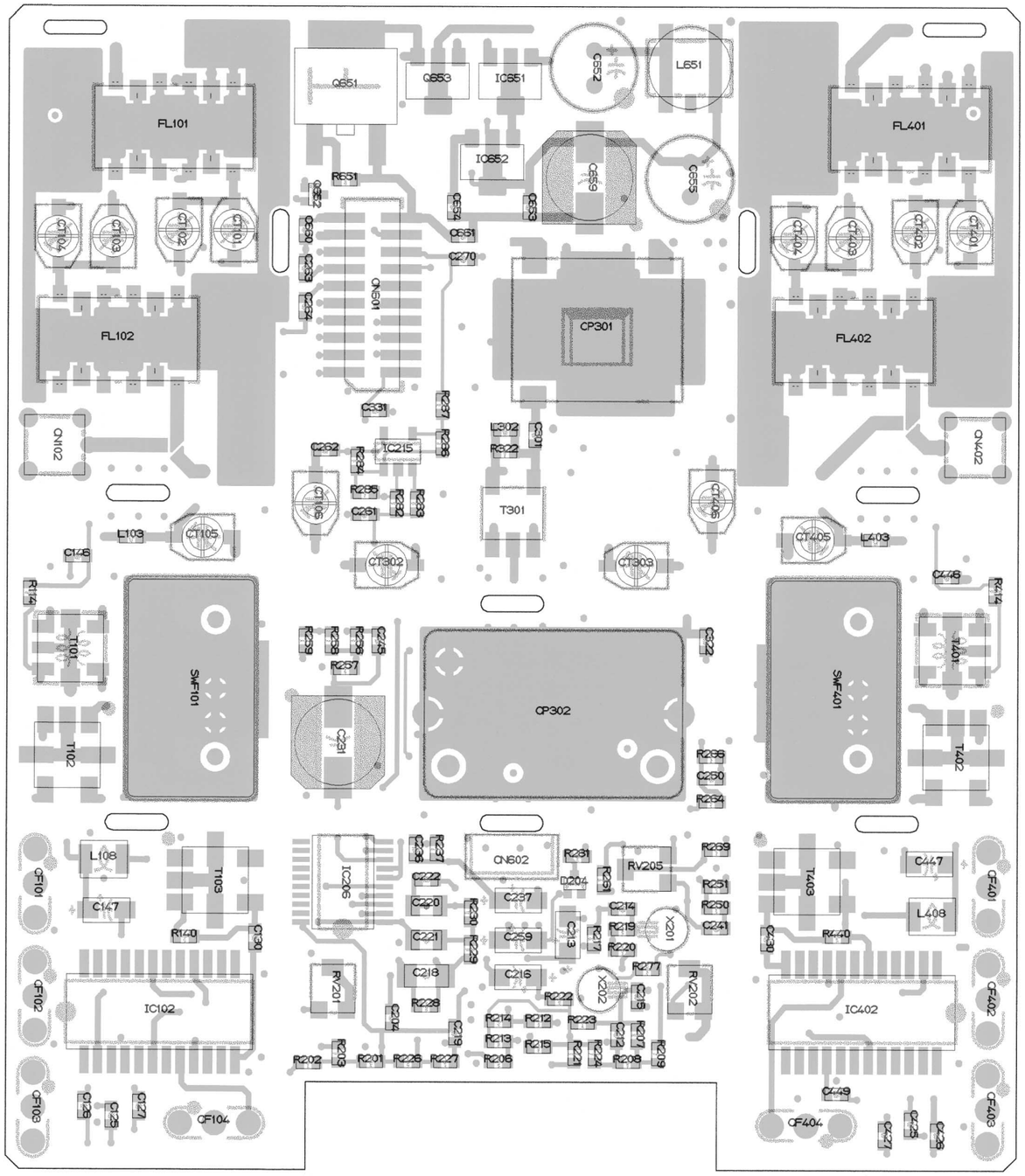
The SW-814 board has the POWER ON/OFF switch (S901) and the MUTING ON/OFF (S902) switch on it. IC901 and Q901 control ON and OFF of the external power supply.


RF Block (A)
RF Block (B)
Ant. IN (A)
Ant. IN (B)
BPF
RF Amp
1st Mixer
SAWF
2nd Mixer
CF
IF Amp
Discriminator
150.75MHz
10.7MHz
VCO
Receiving Freq.+150.75MHz
PLL
LPF
Buffer (A)
Buffer (B)
2nd LO
140.05MHz
AF Amp (A)
AF Amp (B)
Diversity Switch
Mute
De-emphasis
Expander
AF Amp
AF OUT
AF Det.
Tone Det.
Noise Det.
AFM
TONE
NOISE
PLL Data
4 MHz
+7 V DC FROM D-SUB, 15PIN
Voltage Regulator
+6V to RF and AF Block
+5V to PLL
RSSI (A)
RSSI (B)
LE
DATA
CLOCK
LD
BAT 2
BAT 1
BAT 0
5 V
ALO
DIV
TUN-8 BOARD
CPU-342 BOARD
DP-236 BOARD
SW-814 BOARD
CPU
IC701
EEPROM
IC702
LCD
ND801
TO TUN-8, 7V DC
AF OUT
SERIAL I/O
EXTERNAL OSC
REMOTE EXT SW
D-SUB, 15pin
8 MHz
X751
IC751, 752
POWER
MUTING
AFR
RFR
RFG
GP
CH
+
−

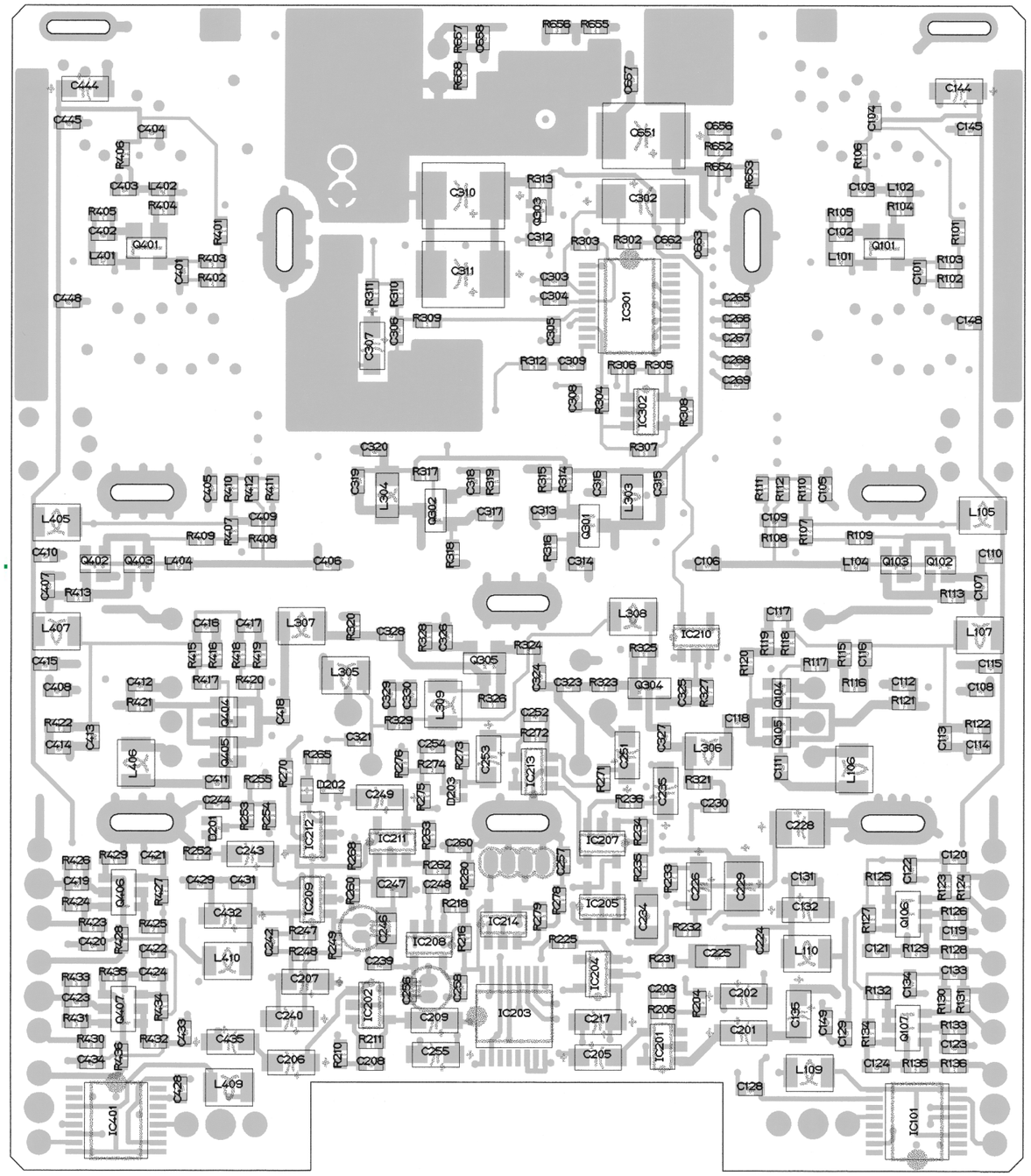
Section 7
Board Layouts and Schematic Diagrams

7-1

TUN-8



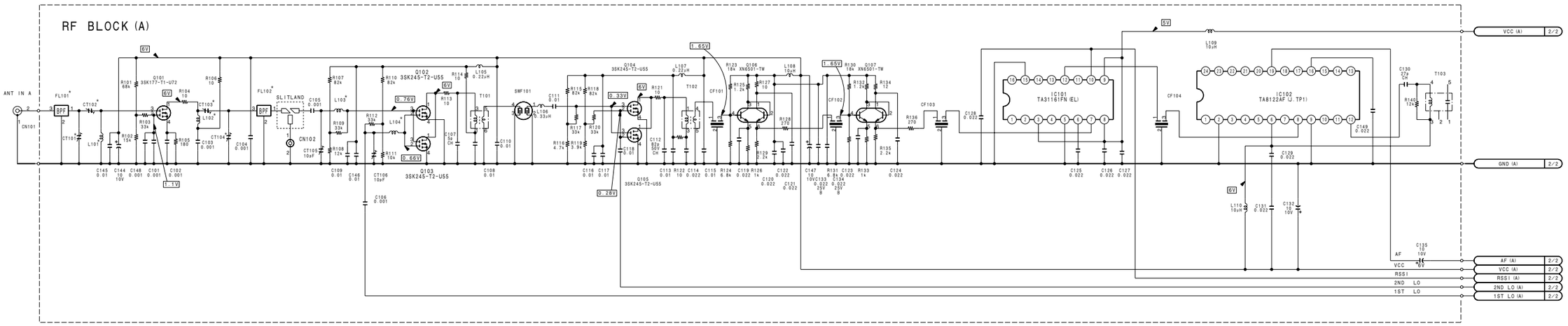
TUN-8 -A SIDE-
SUFFIX: -11



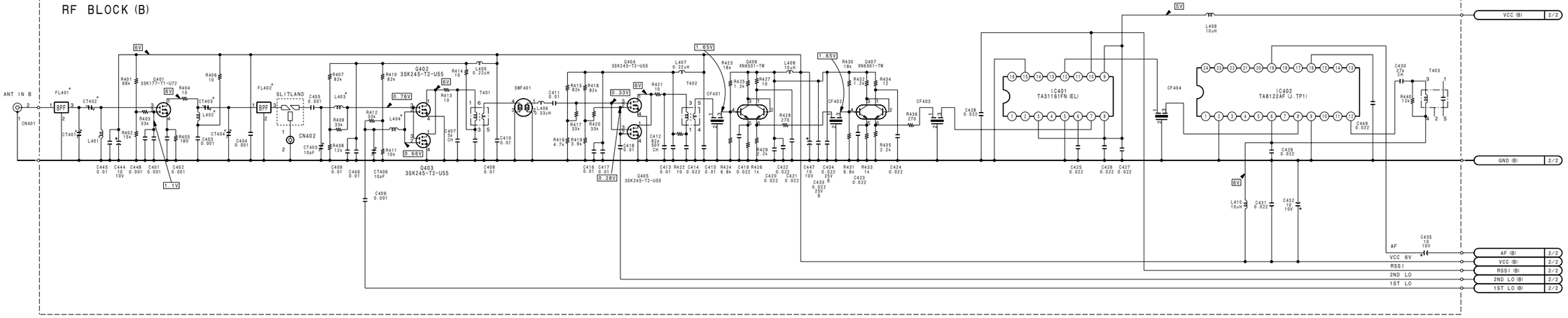
TUN-8 -B SIDE-
SUFFIX: -11

TUN-8 (1/2)

ANTENNA A



ANTENNA B



*:

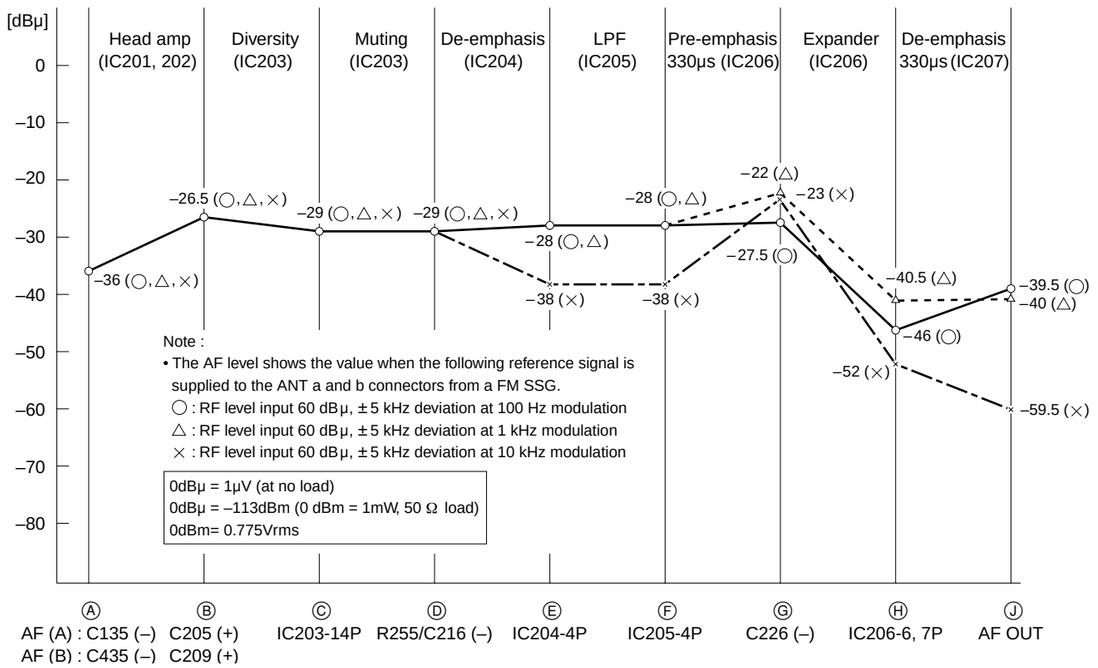
Model* / Ref No.	CE21, U14	CE33, U30	U62	U66	CE62	CE67
CT101/CT401	10pF	10pF	10pF	5pF	5pF	5pF
CT102/CT402	10pF	10pF	5pF	5pF	5pF	5pF
CT103/CT403	10pF	10pF	5pF	5pF	5pF	5pF
CT104/CT404	10pF	10pF	10pF	5pF	5pF	5pF
L101/L401	22nH	15nH	10nH	10nH	10nH	10nH
L102/L402	22nH	15nH	10nH	10nH	10nH	10nH
L103/L403	15nH	10nH	6.8nH	6.8nH	6.8nH	6.8nH
L104/L404	15nH	10nH	4.7nH	4.7nH	4.7nH	4.7nH
FL101/FL401	482MHz	578MHz	770MHz	794MHz	810MHz	850MHz
FL102/FL402	482MHz	578MHz	770MHz	794MHz	810MHz	850MHz

NM: No mount

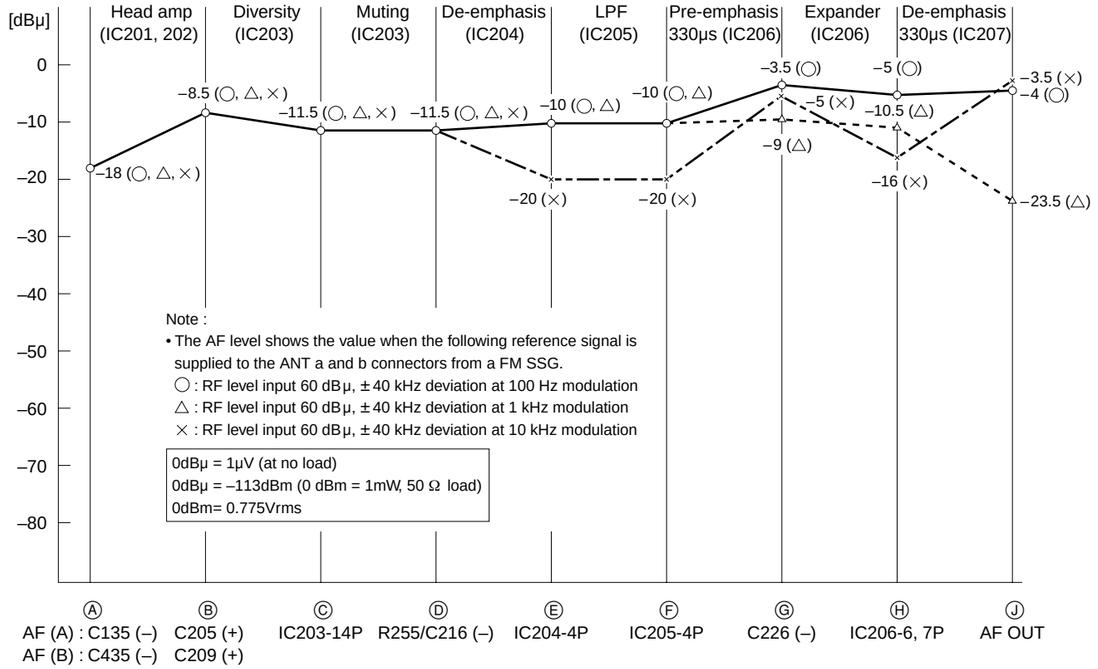
Notes:
- DC voltage are taken with digital multimeter (input impedance 1 MΩ or more) under no-signal conditions.

TUN-8 (1/2)
SUFFIX: -11

• AF level diagram ① (TUN-8 board)

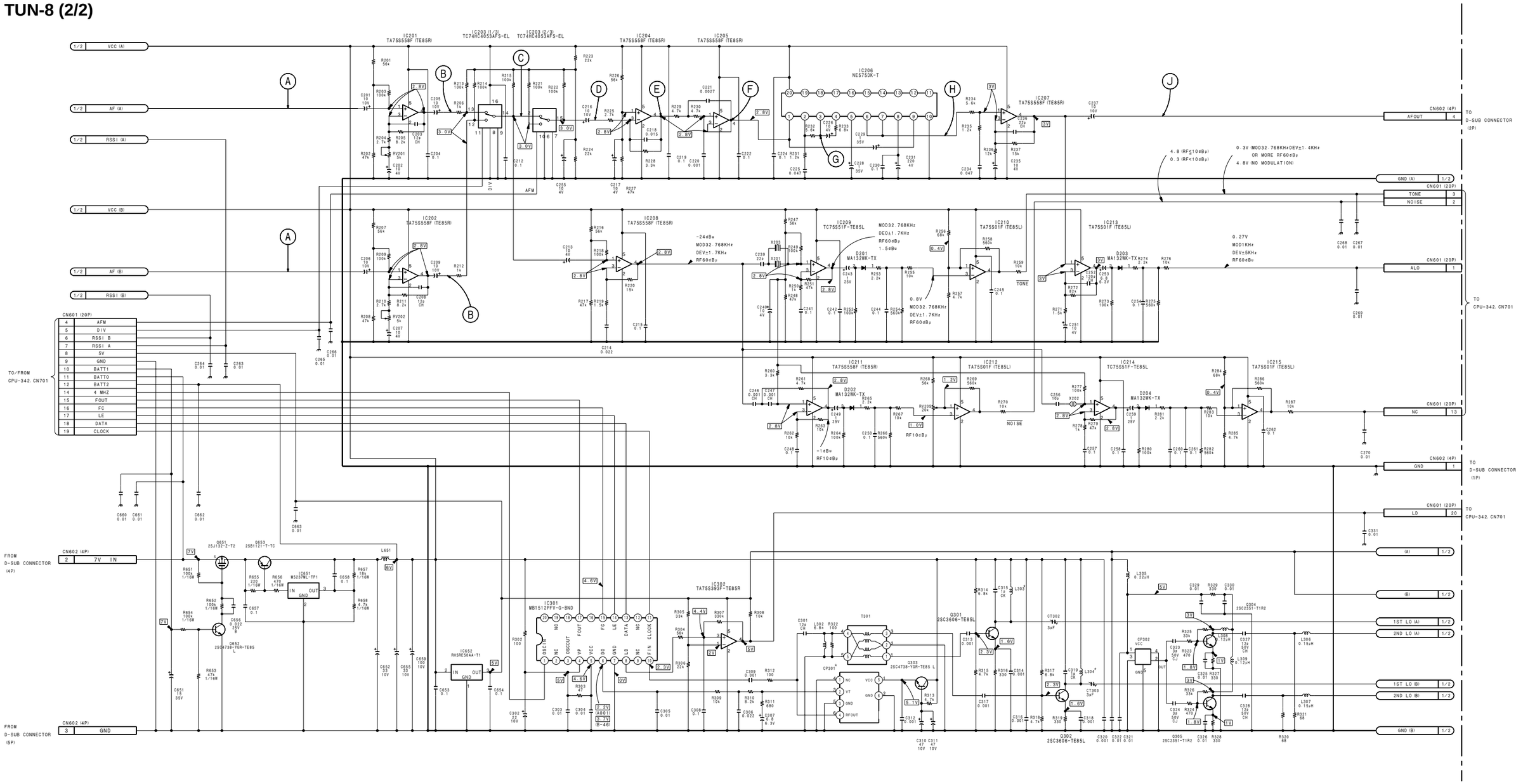


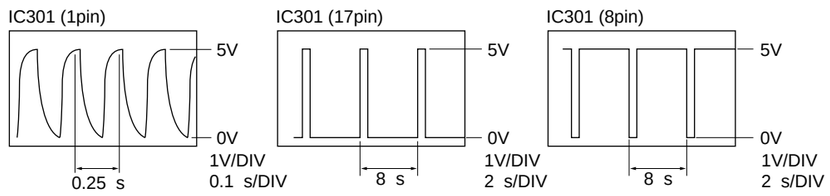
• AF level diagram ② (TUN-8 board)



7-4

TUN-8 (2/2)





*:

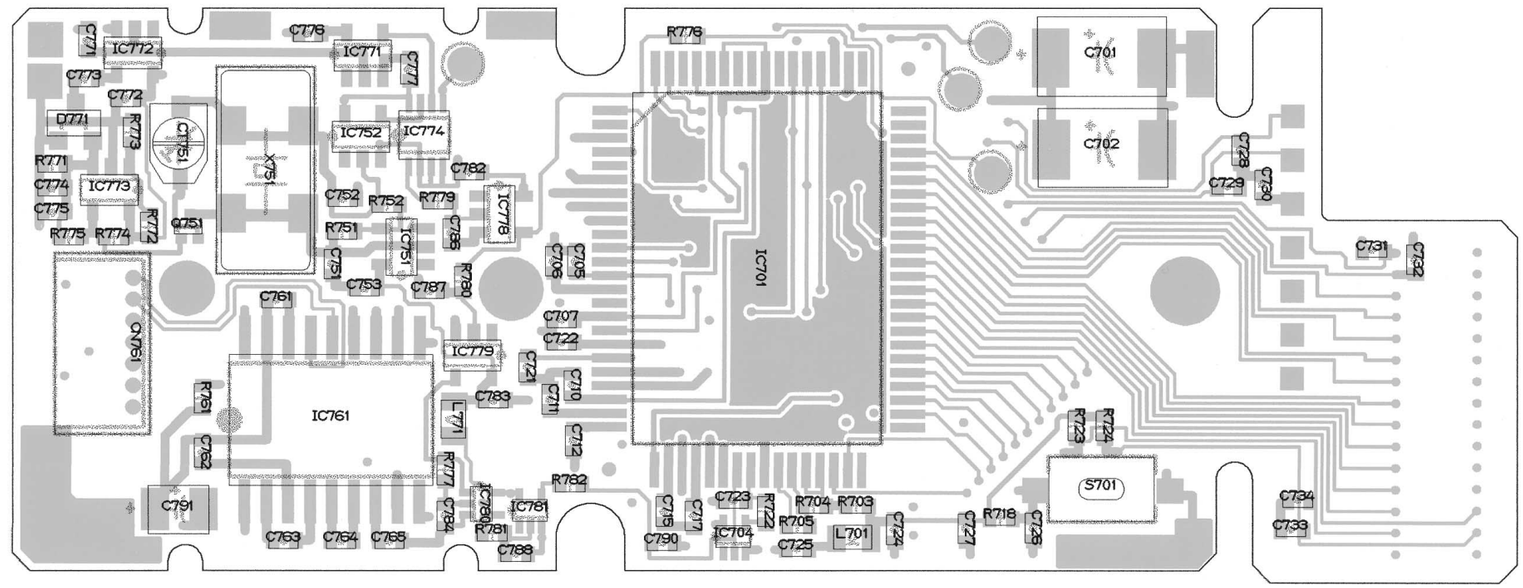
Model* / Ref No.	CE21, U14	CE33, U30	U62	U66	CE62	CE67
CP301	632MHz	724MHz	820MHz	938MHz	957MHz	1000MHz
L303	6.8nH	6.8nH	4.7nH	4.7nH	4.7nH	4.7nH
L304	6.8nH	6.8nH	4.7nH	4.7nH	4.7nH	4.7nH

NM: No mount

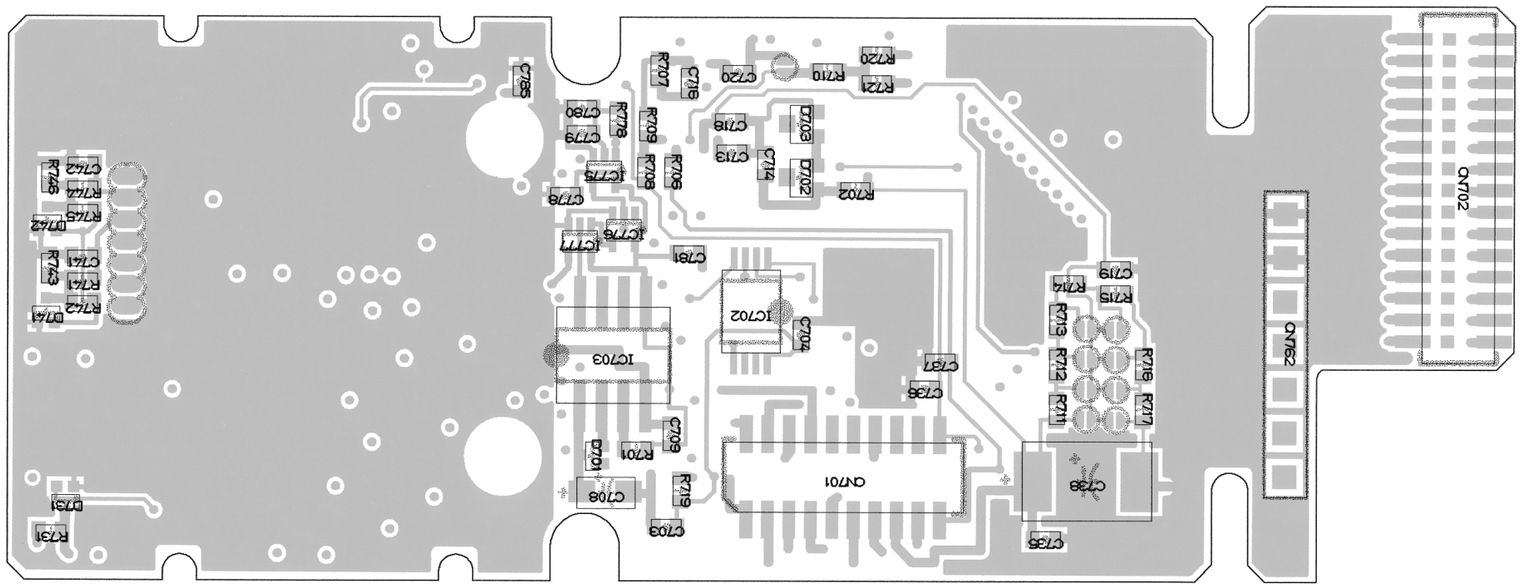
Notes:
- The AF level shows the value when RF signal (60 dBμ at ±5 kHz deviation and 1 kHz modulation frequency) is inputted into ANTENNA A IN connector.
- DC voltage are taken with digital multimeter (input impedance 1 MΩ or more) under no-signal conditions.

TUN-8 (2/2)
SUFFIX: -11

CPU-342



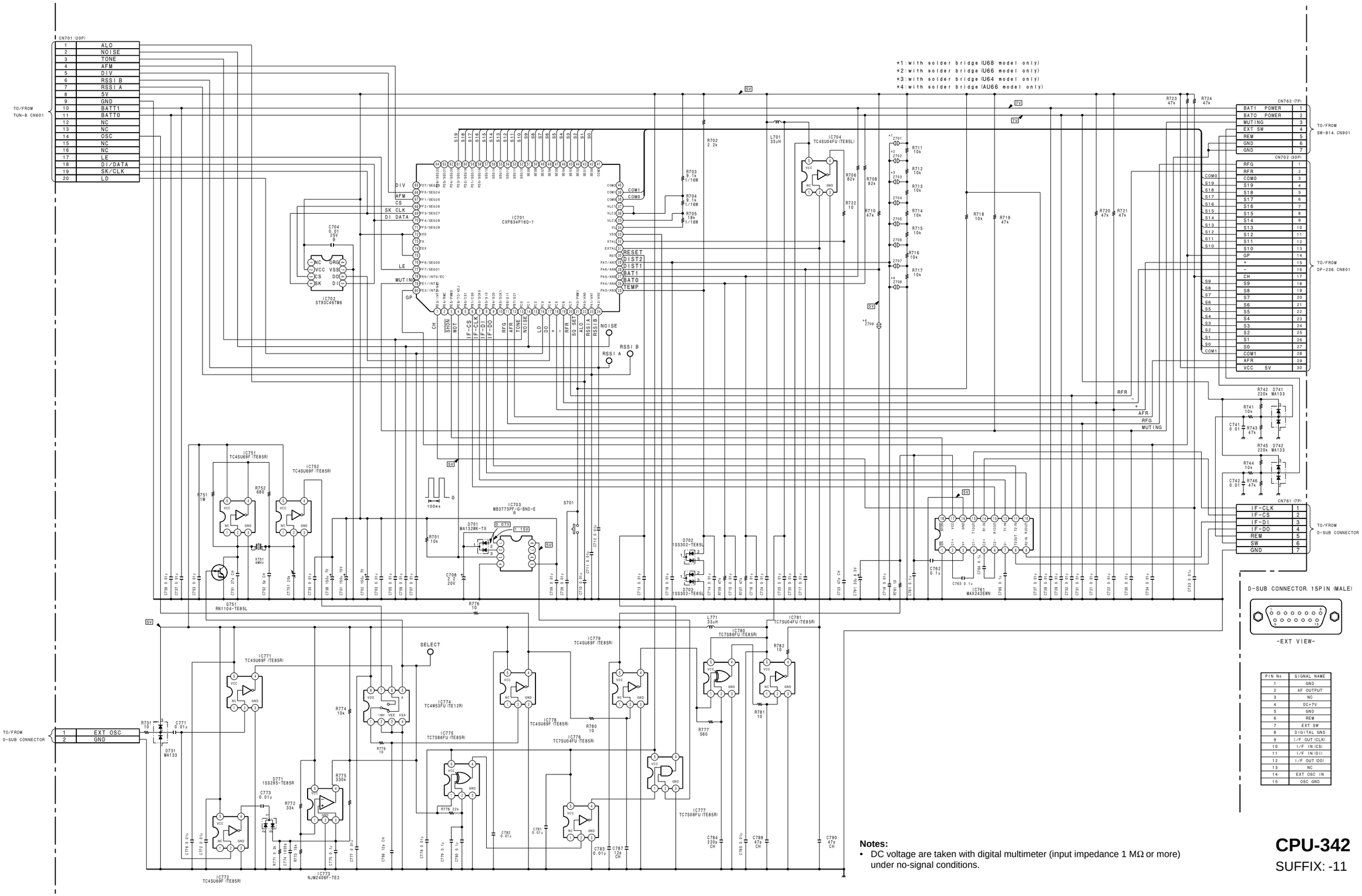
CPU-342 -A SIDE-
SUFFIX: -11



CPU-342 -B SIDE-
SUFFIX: -11

http://getMANUAL.com

CPU-342

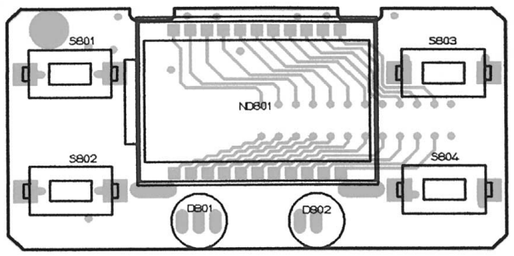


Notes:
- DC voltage are taken with digital multimeter (input impedance 1 MΩ or more) under no-signal conditions.

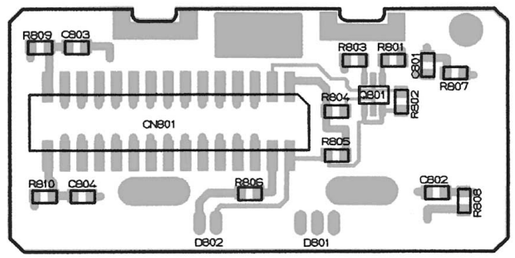
CPU-342
SUFFIX: -11

DP-236, SW-814

DP-236

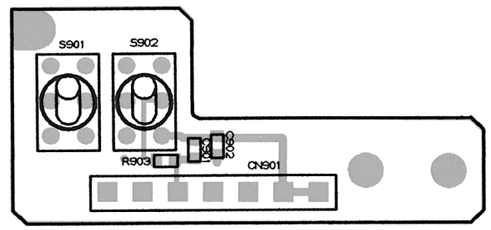


DP-236 -A SIDE-
SUFFIX: -11

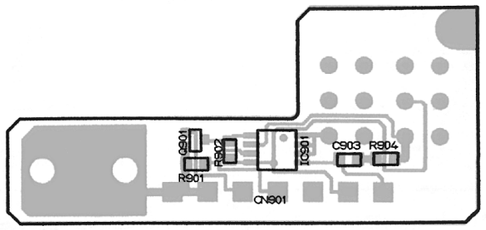


DP-236 -B SIDE-
SUFFIX: -11

SW-814

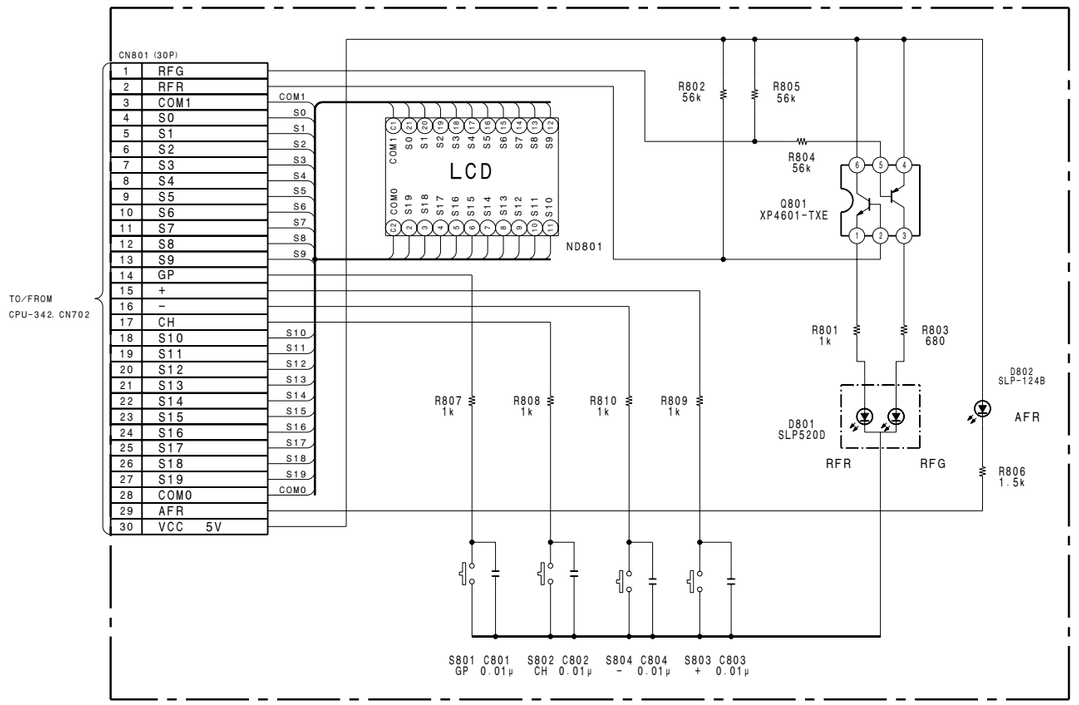


SW-814 -A SIDE-
SUFFIX: -11



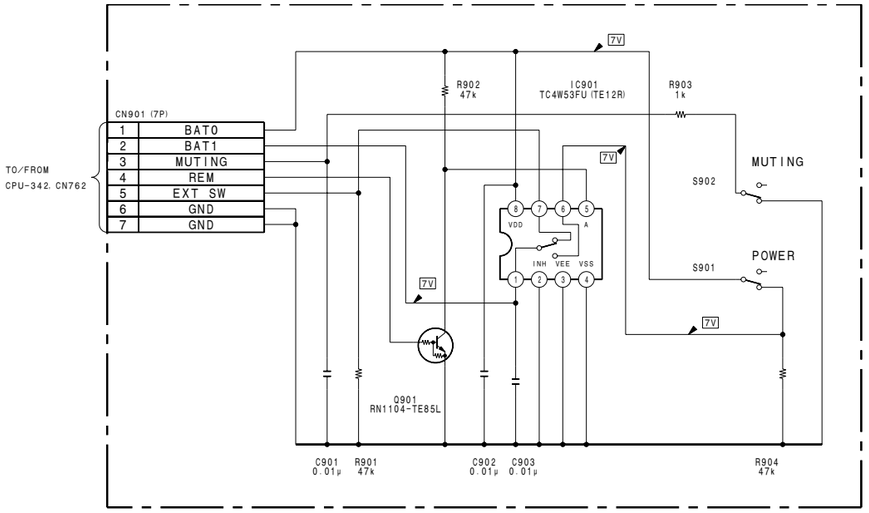
SW-814 -B SIDE-
SUFFIX: -11

DP-236



DP-236
SUFFIX: -11

SW-814



Notes:
- DC voltage are taken with digital multimeter (input impedance 1 MΩ or more) under no-signal conditions.

SW-814
SUFFIX: -111

WRR-855B (U, CE) E
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